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Annual DP Budget Survey



Picking Up the Check

By Peter Bartolik

It may be the fear of future inflation, or perhaps the tail end of the recession. But whatever the reason, DP budgets are increasing at a slower rate than over the past two years, even as DP centers take on increasing responsibilities, *Computerworld's* annual survey of DP managers has found.

While several of the 49 DP managers polled this year said they are appropriating money in anticipation of AT&T divestiture-related in-

creases, for microcomputer purchases and for end-user training, budgets as a whole are not growing as fast as they did last year and the previous year.

The majority of respondents to the survey — 67% — said their budgets for 1984 will be up over the 1983 level, while 16 will experience level funding and one will work with a smaller budget. The increases will average 12.4%, compared to the 17% reported last year and the 20.3% reported the year prior to that.

The one manager who reported a reduction — a whopping 33% cut — said it is the result of a corporate reorganization.

The economic recovery being touted in Washington, D.C., has yet to show up in the spending plans of an overwhelming majority (83.6%) of the managers. A few even said they are still feeling the affects of the recession.

The fastest changing areas of the data processing world, microcomputers and communications, are creating wide divisions in the manner of dealing with procurement and administration, according to this year's survey. Twenty of the respondents reported that microcomputers are purchased out of DP budgets, while 20 others reported micros are purchased by end-user budgets (the remainder had no set

Staff Writer Peter Bartolik coordinated the efforts of the Computerworld writers who conducted the survey upon which this story is based. Members of the survey team included staff writers John Gallani, Lynn Haber and Patricia Keefe and West Coast correspondent Robert Bell.

DP BUDGET SURVEY

policy); last year, 19 managers said end users paid for micros and only six said DP departments paid.

Perhaps reflecting the experimental aura surrounding micro implementation, Henry Goldback, DP manager of Follet Corp. in Chicago, said his company established a "micro study budget" and will purchase about 100 units this year from that budget.

End-user training, particularly with regard to micros, is a responsibility for 85% of the managers, but only half have a readily identifiable budget line item to fund that responsibility. "It's part of each programmer's job," Goldback noted, "but it is not budgeted."

Communications

Communications appears to be another area where both DP management and upper management are feeling their way. Almost half, 46%, reported they have some responsibility for corporate voice communications policy, ranging from giving advice to selecting the entire telecommunications system. An identical percentage also said they have set funds aside in anticipation of increases resulting from the divestiture of AT&T, but only four managers without some say over voice communication have made such a provision.

At Helene Curtis Industries, Inc. in Chicago, according to DP Director Edward Valliere, "We're very concerned [about the AT&T divestiture]. We're just waiting to see, we put aside \$20,000." But James Durkee, vice-president of management information systems for Carson Pirie Scott & Co., also in Chicago, represents the other end of the scale: "We've been upgrading our own switches with purchased equipment. We're positioned to buy anyone's service."

According to the survey, communications will eat up an average of 10.8% of DP budgets in 1984, about the same as last year.

As in previous years, salaries continue to eat up the lion's share of the budget, but that share has dropped slightly from 46% to 43%.

The actual salary increases are lower than in previous years, averaging 5.7% across the board and only 8.8% in those departments which actually are increasing spending for salaries in 1984.

Last year, departments that increased personnel salaries experienced an average 17% increase over the previous year.

In a seemingly inconsistent reversal of last year's survey, 57% of the managers surveyed plan to hire

additional personnel this year; last year, 66% planned not to hire. Positions being created are generally for programmers, analysts and support personnel, although one department expects to hire a data base management system administrator.

Members of this year's survey group said they have less trouble finding qualified DP personnel than last year's group, only 56% of the 1984 group said they have

problems filling positions, compared to 82% last year.

Personnel turnover rates in 1983 were greater than last year's at 20% of the departments, smaller at 26.5% and the same at half of the departments covered in the survey; the 1983 survey had found sharply decreased turnover, which may indicate that DP personnel this year are more secure in their ability to find new employment in an eco-

(Continued on Page 7)

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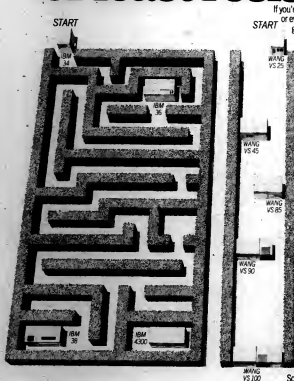
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DP BUDGET SURVEY

(Continued from Page 5)

nomic upturn.

Most managers, about 60%, won't hire personnel without formal DP training. But the majority of those who do hire novices find them to be effective personnel. "Given a little bit of time to learn, they become very effective," said David Sheppard, senior vice-president of DP services with the Boston Co., a financial services company in Massachusetts.

More than 65% of the managers have appropriated funds for training, and such funds average 2.63% of the total budget among the 25 managers who were able to pinpoint the figures.

In a slight dip from last year's 60:50 ratio, the managers reported their programmers spend an average of 46.3% on maintenance work and the rest on new development.

Programmers spend more than 50% of their time on maintenance at 20 of the 48 shops that were surveyed. Three managers reported they employ separate teams of programmers for maintenance and development; one of those said the programmers rotate between maintenance and development.

Vendors will be pleased with one aspect of the survey: 80% of the managers plan to purchase new software, and slightly more than 70% expect to buy additional hardware and peripherals.

Ten managers reported they will be purchasing various types of financial applications packages such as accounts receivable, general ledger and the like; seven will purchase data base management systems; five will be purchasing packages to run under IBM's MVS operating system; three will purchase fourth-generation software; and three will purchase applications generators. Only two managers expect to purchase micro-to-mainframe linkage packages.

IBM will be the big winner in the hardware area, with 10 IBM 3081s (nine at one shop alone), three 3085s, two 4300 series machines, three System/360 and one Series/1 on the managers' shopping lists. One shop plans to buy seven of Tandem Computers, Inc.'s Non-Stop II or TXP units; and several plan purchases of minicomputers and micros.

Purchase and lease of hardware, along with service and maintenance, will cost DP shops an average 19.7% of their budgets this year, down from last year's 32%.

Mainframe costs will eat up the largest chunk, with 15 shops reporting the purchase and license fees at between 20% and 40% of their total budgets.

Software Costs Rising

Software costs, however, will chew up a far greater chunk of the 1984 budget than they did in 1983. Reflecting perhaps the large number of managers purchasing new packages this year, software costs will average about 19.6% of the total budget, compared with only 10% in 1983.

Overall, half of the managers

'Seven managers said their greatest concern [in 1984] will be to reduce backlog, and another five said their concern is to improve efforts to make information available to the end user.'

said their greatest cost increase this year will be in the area of salaries: 28.6% said hardware and 22.5% indicated software will go up the most (some managers picked more than one area, accounting for the figures adding up to more than 100%).

Three managers said their greatest increase will be in the purchase of outside consulting services. Asked to list their concerns as department heads for this year, the managers listed a wide variety.

Seven managers said their greatest concern will be to reduce backlog, and another five said their concern is to improve efforts to make information available to the end user.

Six managers said they are most concerned with supporting corporate goals, and five said increasing productivity tops their list. Five managers mentioned personnel; four are concerned with micro proliferation and micro-to-mainframe communications.



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Management By Consensus

The MIS Chief's Balancing Act

By David Myers

The spread of microcomputers and word processors through the offices of Fortune 1,000 corporations has forced the management information systems (MIS) chief to walk a tightrope.

Beneath lies annihilation — the loss of power within the corporation, even the loss of a job. On the other side lie enhanced stature and leverage, a more important role within the corporation. Whether he makes it across is almost entirely up to him.

Office automation has sparked a trend within America's largest corporations toward computer decision making by consensus or committee. There is nothing radical in that. Corporations live and breathe by committee.

But in the past, it was always the

MIS chief who decided how the corporation was going to automate its information processing functions. Suddenly the MIS director finds he can no longer act alone.

"When it comes to general planning, equipment selection, vendor selection and implementation strategies, it is no longer clear that the MIS director has carte blanche," according to Tom Willmott of International Data Corp., a Framingham, Mass.-based market research firm.

"MIS decisions were once restricted entirely to the data processing department. Administration department heads would choose things like PBX [private branch exchanges].

"Now the MIS director may be involved in office automation, but the president of the company has his finger in the pie, too. No longer is it 'MIS director, write a check,' " Will-

mott maintained.

Why has office automation sparked this trend? Probably because it got its start outside the data processing department, in the administrative offices of the corporation.

As Susan Roper, manager of office automation for Hughes Aircraft, put it, "More and more individuals are saying they want that tool." They aren't walking down the hall to the DP department for help, that is; they are demanding the resources for solving their own problems themselves.

What has resulted is a proliferation of microcomputers throughout many corporations. Rather than waiting for the MIS chief to get around to them, department heads are going out and buying machines for their personnel.

(Continued on Page 10)

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MANAGEMENT BY CONSENSUS

(Continued from Page 8)

Joseph E. Izzo of the JIA Management Group pointed out that in 1979 only 5% of the computers installed in U.S. companies were outside the control of the data processing department. This year the number is gauged at between 30% and 35%.

"When the [Apple Computer, Inc.] Apples came out, everybody wanted one.

"The MIS group is not a police force. I don't see it as our role to go out and see if [other departments] need the productivity gains they say they'll be able to achieve" with office automation." — Raymond Priore, vice-president of systems and information processing at Consolidated Edison of New York.

They became a sort of de facto standard. Now the thing is happening with the IBM [Personal

Computer]. We have to race just to keep up," said Jim Stockwell, manager of data processing at Teledyne, Inc.

Of course, as soon as one brand of computer is installed in one department and another brand in another department, the problem of incompatibility rears its ugly head.

In order to stave off incompatibility woes before they arise, many firms are beginning to appoint committees to draw up plans for corporationwide office automation.

The committees are not a welcome sight; no one in American business wants to serve on yet another committee; but they became necessary when it grew clear that DP departments did not have the power to enforce compatibility requirements.

"We have no centralized control. These people [in other departments] don't necessarily have to come to us" before springing for microcomputers, Roper said.

Indeed, a good many American firms are "highly decentralized," split up into "individual business units with their own business requirements," as Anthony Pizzelanti, vice-president for information systems at the Macmillan Publishing Co., pointed out.

Central Committee

In these firms, a central committee — often disguised under the gentler sobriquet "Office Automation Task Force" — is the only way to keep track of and have a semblance of control over what is happening in the various corporate departments.

The committee may include top-level executives. "I expect senior management to get more attuned to the process. It's inevitable anyway," Pizzelanti said.

The involvement of top-level execs is inevitable because office automation is something that interests them, whereas data processing seems alien, according to Teledyne's Stockwell.

What is more, top-level executive involvement is welcome to many MIS directors because it relieves them of the responsibility of judging other department heads' equipment requests.

'Not Police Force'

"The MIS group is not a police force. I don't see it as our role to go out and see if [other departments] need the productivity gains they say they'll be able to achieve" with office automation, noted Raymond Priore, vice-president of systems and information processing at Consolidated Edison of New York.

An Office Automation Task Force also prevents other departments from feeling as if strange machines, foreign procedures and unobtainable productivity goals have been foisted upon them.

"It's a way of ensuring that the right constituency gets involved in decision making," according to Raymond L. Boggs of the Venture Development Corp.

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Thus the task force is a sort of users group. And some firms, in fact, have set up a variety of small, in-house users groups rather than a single central committee and have decided to permit a controlled proliferation of small systems, as long as there is no overlap between departments with incompatible machinery.

In any case, the task force or users group method of decision making puts the burden of proof squarely upon the user for justifying his need for automated office equipment.

"It's the user's requirement, so he should be the one to have to justify it to the corporation. Not that I couldn't participate in the justification process. But I don't see as my role," Priore contended.

Added Benefit

Placing the onus for justification upon the user has the additional benefit — from the MIS director's perspective — of awakening department managers to the cost and implementation difficulties that are involved in a new system.

As Roper pointed out, involving users in the acquisition process scales down their expectations and makes them more sensitive to everything that goes into choosing and starting up a system.

"If they are not involved in the acquisition process, they could end up wasting more time with a personal computer than they save," Roper said.

MIS Chief's Role

But what of the MIS chief's role in all these changes? Will the increased involvement of top-level execs in computers decrease his power within the corporation? Or will the involvement of users in computer acquisition increase their dependence on him and so enhance his standing in the firm?

"It all depends on the character of the MIS manager," Boggs said. "If he is really concerned with how the equipment is going to be used on a day-to-day basis, which means he must understand how business is conducted so the equipment won't have a disruptive effect, then he has a future."

"But if he is technologically driven — if he is insensitive to people's needs — he is vulnerable to being co-opted by the committee," Boggs added.

To survive the challenge of office automation, the MIS chief must become "far more of a businessman than he is now," JIA's Izzo agreed. Izzo suggested that the MIS director should subscribe to *The Wall Street Journal* and *Business Week* and concern himself with the most pressing of business issues.

'Not Just Manager'

The encroachment of top-level management upon his traditional territory means the MIS chief must become "a leader, not just a manager," Izzo added.

While some MIS directors bemoan a weakening of their position as a result of growing "computer literacy" in the executive suites,

"Will the increased involvement of top-level execs in computers decrease his power within the corporation? Or will the involvement of users in computer acquisition increase their dependence on him and so enhance his standing in the firm? 'It all depends on the character of the MIS manager. If he is really concerned with how the equipment is going to be used on a day-to-day basis, then he has a future. But if he is technologically driven, he is vulnerable to being co-opted.'"

— Raymond L. Boggs, Venture Development Corp.

others are viewing it as an opportunity to be seized.

As Roper pointed out, the MIS managers are the ones to provide training and guidance. As Tele-dyne's Stockwell explained, as long

as there is a need for technical advice, there will always be a need for MIS directors. Those who fear a reduction of their power as executives learn more about computers have already had their power re-

duced, Izzo said.

"The more executives know, the more powerful he [the MIS chief] should be. That's where his greatest power will come about. As executives become [computer] literate, he has the chance to become a leader," Izzo said.

Perhaps the greatest challenge, however, will be not to the MIS director himself but to the data processing department as it is known today.

As more and more users become adept with office automation, they may begin to infiltrate the inner computer sanctums. And there may evolve a new organization within the American corporation — the Office of Computer Technology.

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MIS Managers

Traditionally one of the most underbudgeted items in data processing, DP training needs have grown beyond the traditional technical courses offered to help departmental staff keep up with the latest hardware and software innovations. Today, because of the growing corporate reliance on the management information systems (MIS) function and the onslaught of end-user computing, a new dimension to training has been created — one that imbues everyone in the DP department, from the vice-president of information systems to the programmer, with a business orientation.

An understanding of business in general — and the specific company's business in particular — bodes well for DP professionals who can expect to broaden or lengthen their career paths by taking steps to become business-literate while working to help their end users become

computer-literate.

In an attempt to determine the role of MIS in relation to the needs of the corporate world, Computerworld recently interviewed five high-level MIS executives employed in industries that represent some of the largest users of information processing. The professionals interviewed included:

- From the retailing industry, Anthony M. Grybowski, manager, Systems & Data Processing, Federated Department Stores, Ohio. Grybowski holds a B.S. in accounting and an executive degree in business data processing.

- From the manufacturing and services sector, Donald J. Marino, director of Management Information Systems at Bendix Corp. in New York. Marino, who earned a B.S. in business administration, worked 10 to 12 years in product scheduling before spending the last 20 years in systems analysis and

systems management.

- From the transportation industry, Robert Forstrom, vice-president of Information Systems for The Bekins Co. in California. He has a B.A. and a master's degree in chemical engineering. Forstrom began his DP career as a systems programming manager 20 years ago.

- From the diversified financial area, Edward Huntington, assistant vice-president/Equipment, Finance Data Center, Citicorp Industrial Credit in New York. Huntington, who concentrated in computer science in college, has been in DP for 22 years.

- From the commercial banking sector, H. Alfred Colby, senior vice-president of Information Services, John Hancock Mutual Life Insurance Co., Boston. He has a B.S. in economics and worked on systems analysis and managed projects in the user community before being promoted to his current position.

Broadening the Perspective

By Patricia Keefe

Is it important for management information systems managers to broaden their perspectives and skills beyond the narrow technical realm of DP? If so, why?

Grybowski: Absolutely. The MIS director has to respond to the business that the organization is in and the DP business. In order to do so,

Patricia Keefe is a staff writer at Computerworld.

he must be involved in all aspects of the company, such as marketing and manufacturing, to get a feel for the business and to implement priorities with upper level management.

MIS executives need to be more aware of corporate goals so they can contribute a bit better to the bottom line. In other words, MIS directors should not operate in a vacuum.

Marino: There's no question that much of the black eye given MIS in the press — some of it well deserved — is created by the fact that [MIS has] taken technicians and made them managers instead of taking managers and teaching them technical abilities. All of my managers are business-oriented. At Bendix [Corp.], now Allied [Corp.], we have a kind of top-down, bottom-up structure where our strategies and



Anthony M. Grybowski



H. Alfred Colby



Donald J. Marino

MIS MANAGERS

objectives are business-oriented and need MIS support to make those objectives come true.

Forstrom: Yes, it is advantageous from the point of view of the [chief executive officer] and officers of the subsidiary. In their view, the MIS top executive should be a manager, and this would require him to have broader skills. As a participant in the strategic planning of the company... I am expected [not only] to contribute technical solutions to corporate problems, but [also to contribute] ideas from a business standpoint. Subsidiary presidents say I should know their businesses as well as they do in order to contribute technical solutions to the business problems that they have.

I have found that users do not understand how to apply technology to business, so they expect DP to understand their problems, such as in operations, marketing and business.

Hastington: Yes, the reason being that unless a DP or MIS manager has an idea of what's going on in the world around him, especially in application or user areas, he cannot really perform his job properly. He must be able to understand the needs of the user community.

Colby: It is important to have business skills in addition to having good managerial skills for my professional and technical people, especially at senior levels, where [they are] beginning to get much more involved in the business the company is in.

Does the need for an ability to look at the overall business picture apply to your technical staff as well as to you?

Grybowalski: I believe it is essential that they get some background in accounting, marketing and psychology. When they get involved in applications, people can do a better job if they have an understanding of the users' requirements.

Marino: My own background is 20 years in DP and an additional 12 years in an operational production environment. Many of my supervisors, and especially my systems analysts, were brought in from user groups to be trained as MIS people. We cross-pollinate. We have a program now that takes user analysts, teaches them DP and then sends them back to their respective departments to help us.

Forstrom: Partly yes and partly no. Some people need both, such as systems analysts and programmers. I have found that business programmers don't necessarily have to understand the implementation of what they do.

Hastington: I like my systems programmer management and operations management to know what is happening in the world outside hardware. If they approach applications with tunnel vision, they will not be as receptive to user

needs and problems.

Colby: There is room for both technically [oriented] and business-oriented data processing staff. We need more than ever good technical people — next year we [in MIS] expect to experience growth of 16% to 20%. In some cases, there is no need for good technical people to be involved or to know about business plans. On the other hand, as we are called upon more and more to help end users, it becomes important to understand their business.

How are you handling business-oriented training for your technical staff members?

Grybowalski: Our main way is to offer a tuition refund program and to encourage staff to attend evening classes. If they have a computer science degree, we recommend that they attend business classes, such as marketing or accounting. If they have a broad background in college, we try to expand them further, rotating them on different systems, such as marketing, manufacturing and accounting.

We use a combination of training methods. We do have manuals, which we supplement with on-the-job training. The quickest way to

learn is probably to use manuals and team the person up with a more experienced staff member to get him accustomed to the particular job, then turn the job over to him and see how he does.

Marino: Since 1976 we have had an account with a company called Advanced Systems, Inc. in Chicago. We are a big user of its audiovisual devices. We started actually structuring the training program for systems analysis courses several years ago using its media. We put a lot of our systems analysts, programmers and technical people

(Continued on Page 14)

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MIS MANAGERS

(Continued from Page 13) through those courses.

We have staff meetings weekly, where all the higher level technicians sit in and describe their weekly activities, and I describe what's going on in the business world.

At my level, in this division, I report directly to the vice-president and general manager on the staff level with the other directors of the various functions. In addition to conventional systems programming and computer operations, I have a software and education group with a supervisor of education whose basic responsibility is to control the education of the 70-some people who work for me.

We also support highly professional organizations, such as the Data Processing Management Association and [the American Federation of Information Process-

ing Societies, Inc.]. This program allows [technical employees] to go back to college to finish degrees or further their education — and it does not have to be computer science — and the company pays for it.

Forstrom: We provide some on-the-job training and education. We get people to spend time with the business people as much as possible. We encourage people to take university-level business classes, such as MBA or advanced-degree courses. We also provide in-house, video-assisted training.

Hastington: We have almost daily meetings with the user community to discuss how we can change things. It's an open dialogue where they can discuss problems they have, or perceive to have, with the DP center and address them

and bring them out in the open.

We are primarily an IBM shop, and we send staff to IBM schools. Also, two members of the staff attend school at night in the computer science field. We also send operations managers to various IBM seminars for an exchange of ideas, to see what's new in equipment.

Many user departments hold seminars, which we attend when time permits. Unfortunately, that's not too frequently.

Colby: We talk about it some, of course. There are a number of professional [insurance] organizations that provide courses, such as the Life Office Management Association [Loma] and Charter Life Underwriters. The company pays for the Loma courses, subsidizes the books and provides a bonus upon passing each of the

nine exams in the series.

We also have some insurance-related courses run by the personnel department. And we have a regular education center with its own entry-level courses and a couple dozen higher level courses.

In a more important way, we rotate assignments. We have a couple dozen people out at the moment, rotated out in user areas. This includes systems and management people who typically work an assignment for one to two years. They are dedicated to systems analysis and specification development of the user department, for example. In return, we'll take users into our area. Some users are in management jobs, such as systems management and directors.

is the growth of end-user

computing a major force behind the move toward general business education for technical staff members?

Grybowalski: In some companies, end-user computing may force it, but in our particular company, we've always been user-oriented, and we've always gone the extra mile for the user to keep him happy. Most of our end users are in the engineering and technical [research and development] areas. There is some demand to hint there will be more growth in [end-user computing].

Marino: We've got a whole program going whose sole purpose is to introduce computing to the world outside of MIS. And to do that, it's kind of an information management concept, however, it's not that formal. We have a huge network of 300 CRTs that we are making available to users, including a variety of software products and applications and about eight personal computers in a few strategic areas. We are trying to develop a strategy for personal computing. I really don't see a lot of impact here, because a lot of my MIS people are going for additional education anyway.

Forstrom: We have a need to work with and assist a broad range of users on everything from the information center idea to personal computer ideas. The staff is assigned to do that. To a degree, although I don't know if it has a significant impact, it has caused a few people to have to understand business. Generally, staff systems always understand it anyway.

Hastington: We are just embarking on an office automation project where we are placing micros on 75% of the desks in the division — that is just starting up. Only the first 25 computers have arrived, and they are being installed on a top-on-down basis. I suspect this will underline the need for a business orientation, although as of yet we are not feeling any impact.

Colby: End-user computing is growing in leaps and bounds here. We have an information center with a couple hundred users, and it's growing at 100% a year. We find we are being called upon more and more to support this, to provide training and advice. Strangely, it has not adversely impacted the traditional central operations.

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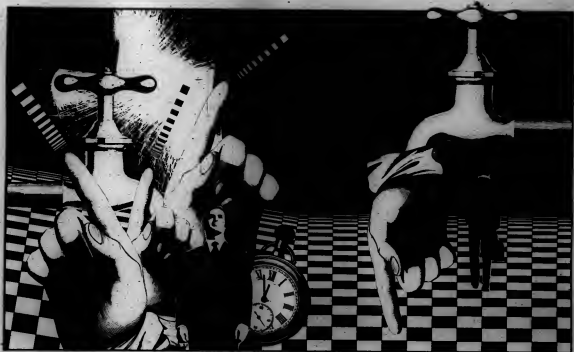


ILLUSTRATION BY SARAH WATSON

By Jim Bartimo

Keeping track of the new products, technologies and buzzwords of the computer industry is as difficult as keeping track of the Top 40 hits in popular music — as soon as you get used to one, another one comes along to replace it.

In the ongoing effort to keep our readers up to date on new trends, *Computerworld* has compiled this list of upcoming and outgoing technologies as a guide for the confused. Readers are advised to use this list as but one source of information on an ever-changing industry.

What's Hot in Chip Technology

Digital Equipment Corp. last summer invested \$26 million in Trilogy Ltd., a company promising to bring wafer technology to the computer

industry [CW, Aug. 8]. Promising high reliability, wafer technology places all circuitry on a single 2 1/4 sq.-in. wafer instead of wiring hundreds of individual chips to boards. "We always talk about high tech, but this is an order of magnitude higher than high tech," according to David Dell, director of research services at the Diebold Group in New York.

Perhaps another few orders of magnitude higher than wafer technology is the **biochip** — the computer industry's attempt to turn living organisms into microchips. Some predictions call for a reduction in size by 500 times from current silicon chips, but others say the chips could be 80 years in the making.

Biochips are made from existing biosystems, such as large protein

molecules, to produce electronic circuits and switches or by synthesizing an electron-trained molecule from scratch. Suspiciously close to reproducing the human brain, biochips would prove a boon because "the processing capacity of your brain is more dense than any chip," according to Kenneth Bosomworth, president of International Resource Development, Inc. (IRD), a Norwalk, Conn.-based market research firm.

What's Not Hot

If IBM, Bell Laboratories and Sperry Corp. say **Josephson junction circuits** are dead — they're dead. Research attempts to super-cool circuits to reduce resistance and increase speed were dropped by all three organizations last year, short-circuiting British physicist

(Continued on Page 16)

Jim Bartimo is a senior editor/communications for *Computerworld*.

WHAT'S HOT AND WHAT'S NOT

(Continued from Page 15)
Brian Josephson's idea [CW, Nov. 14]. Silicon and gallium arsenide technologies are still best bets for the immediate future of processors.

What's Hot in Systems

There are 675 micro hardware products on the market today and 154 manufacturers, according to IRD. The microcomputer has hit the industry with a force strong enough to support some 100 micro-computer publications and employ countless third-party software developers. The question still weighing heavy on everyone's mind is:

When will the micro market turn cold?

What's Not Hot

DEC clock last autumn took a one-day plunge of 21 points, following in a more drastic manner the lead of other microcomputer makers such as Data General Corp., Prime Computer, Inc. and Data-point Corp. While the minicomputer will be with us for some time, it will most likely be best utilized in specialized niches such as office automation and engineering — leaving distributed data processing

in the hands of its smaller brother, the micro.

What's Hot in Displays

Whether it turns out to be electroluminescent, liquid crystal or plasma, flat-panel displays will account for 50% of the computer displays within three years, according to Bosomworth. Since the general shape of things in the computer industry is trending toward miniaturization, the compaction of the CRT's footprint would be a natural development.

What's Not Hot

Adam Osborne will tell you — 5-in. display screens can be hazardous to your health. While his computer's peephole display screen wasn't the only reason his company filed for protection under the Chapter 11 bankruptcy statute [CW, Sept. 19], it didn't help.

What's Hot in Storage Technology

Boasting 4G bytes of storage and sometimes even more, one optical disk storage system can store the entire *Encyclopaedia Britannica* if necessary. Optical disks grew out of the entertainment industry's marketing of movies to the home and, as a result, can store images as well as digital information.

While there are numerous applications for document storage already in place today, 1984 could well see a boom in erasable optical disks that are interchangeable with magnetic disk drives. "If there's a breakthrough in cost for erasable disks, they'll naturally take off," according to Hank Koehn, director of futures research for the Los Angeles-based Security Pacific Bank.

Vertical recording technology strives to stand magnetic bits of information on end instead of side by side on a disk as they are today. According to Diebold's Dell, this would have a compacting effect, leading to 4 billion bytes on one disk by 1985 and 15 billion bytes on a disk by 1990. "They wouldn't



The IBM Personal Computer is hot.



The 5-in. display was hot in the days when Adam Osborne and his staff first showed it off. It's not hot anymore.

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Feb. 7, '84	Ft. Lauderdale, FL
Feb. 28, '84	Los Angeles, CA
Mar. 1, '84	Palo Alto, CA

WHAT'S HOT AND WHAT'S NOT

look a hell of a lot different, but there would be 100 times the density [of information]," Dell said.

What's Not Hot

Last year at this time, microcomputer users were barraged with multiple sizes in disk drive offerings, and many wondered which one would end up being the standard. Now, it looks like the use of 8-in. disk drives and 3½-in. disk drives will not reach widespread use in the microcomputer market. With even advanced micros such as the Apple Computer, Inc. Lisa setting on 5-in. drives, the micro market has at least one standard by which to live.

What's Hot in Memory

"Nonvolatile" will be the name of the memory game next year, and the winner in the portable terminal and computer market will remain Cmos. Currently featured in notebook computers from Radio Shack, Epson America, Inc. and NEC Information Systems, Inc., Cmos allows internal memory to remain intact with a power source as small as four AA batteries. "The price is coming down and will continue to drop by 40% per year," Dell predicted of Cmos.

What's Not Hot

A clear parallel to Cmos is magnetic bubble memory, which utilizes no power source at all to maintain memory, but instead relies on magnetic bits to live up in rows after the power source is shut down. What's the problem with magnetic bubble? Its high price tag has not captured the support of many vendors, and a lack of vendor support has led to a continued high price tag.

What's Hot in Software

Optical disk storage is hot.

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"People in the home and in business don't have the time to fool around with software," Koehn said, so windowing capability and integrated software packages are among the hottest items in software.

Introduced by Xerox Corp. in its office automation workstation, the Star, windows allow the user to treat the computer screen like a desktop where various files can remain open simultaneously. Third-party software houses such as VisiCorp have developed windowing for the IBM Personal Computer, and the Apple Macintosh (when introduced in January) is predicted to feature similar windowing to the company's Lisa.

Keeping the users' needs in mind, integrated software — such as that found in Lotus Development Corp.'s 1-2-3, Sperry Corp.'s Sperrylink office system and DEC's All-in-One software — allows users to transfer data, text and graphics easily from one file to another. If Comdex/Fall '83's 20 introductions of integrated packages is any indication, this type of software will remain popular throughout the next year [CW, Dec. 5].

What's Not Hot

With integrated software and powerful data processing available for under \$10,000 with a microcomputer, hooking up a dumb terminal to a remote host in a time-sharing configuration has become

less and less necessary. "The next five years will see an almost total disappearance of the raw computer utility concept," Ed Metz, senior vice-president at Input, Inc., told *Computerworld* last September.

What's Hot in Communications

Last year was the year of the nonblocking private branch exchange (PBX) telephone system, which promised the ability to switch data and voice with equal efficiency. Dubbed "the next-generation PBX," nonblocking architectures, such as those from Intecom, Inc., Zel, Inc. and finally Rolm Corp., suggested that local-area networks could be best
(Continued on Page 18)

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WHAT'S HOT AND WHAT'S NOT



VisiCorp's Vision is one of the hot windowing packages.

(Continued from Page 17)

achieved through existing telephone wiring.

Nonblocking "allows one port access to every other port," according to Edward Horrell, president of the Memphis, Tenn., consulting group, Mitchell & Horrell, Inc. "Now that data is on the line as well as voice, nonblocking is important because data can't tolerate the delays that voice can."

Industry pundit Dixon Doll, president of the DMW Group, Inc., predicted that "every vendor planning to offer voice and data switching will commit to nonblocking."

What's Not Hot

There is no shortage of reasons why video teleconferencing is not

taking off as was once expected. While teleconferencing was predicted to cut travel expenditures by allowing video meetings to take place over data lines, the unfamiliarity of the technology seems to be too much of a hindrance.

"We have a lot to learn about how people interact," Koehn said. "People become controlled, and there's less friendly banter with videoconferencing. There's also a lot of nonverbal signaling going on [that isn't picked up through teleconferencing]."

What's Hot in Computer Crime

The movie *War Games* did more for the reputation of computer hackers than any teenage whiz kid could have in his best system-cracking days. The media jumped on almost every prosecution — including the 414s and the Wizard of Arpanet — with an unusual fervor [CW, Sept. 12]. Why the sudden interest in hackers? If these kids can crack these systems, perhaps computers are not so threatening to the public after all.

What's Not Hot

For the sixth year in a row, the U.S. Congress has failed to act on a federal computer crime bill that would make the misuse and abuse of computers a federal crime. While Rep. Bill Nelson (D-Fla.) vowed at the start of the congressional session to push through the controversial H.R. 1092, the bill never got any further than subcommittee hearings [CW, Nov. 28].

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 - New York (April 12-13)
- Micro/Personal Computers: Comparative Analysis and Implementation Guidelines
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- Electronic Communications for the 1980's
 - New York (Jan. 16-18) • Dallas (March 21-23)
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Micros And the End User

A Passing Fancy?

By Jeffry Beeler

The sometimes sweet, sometimes stormy romance between big business and small computers is entering a new phase in its evolution—a development that confronts management information systems (MIS) directors with significant management and technological issues as they look ahead to 1984.

Only a few years ago, the question that dominated conversations among prospective buyers of commercial personal computers went as follows: Are microcomputers just a passing fancy, mesmerizing but hopelessly impractical playthings, or will they take their place alongside other business machines in large corporations and prove their mettle in serious, demanding applications?

Jeffry Beeler is a Computerworld West Coast correspondent.

What began between big business and personal computers as a harmless flirtation and progressed into casual courtship has blossomed into a passionate love affair and is now hurtling inexorably toward engagement and a rendezvous at the altar. At the least, the pair is already openly cohabiting, as evidenced by the growing list of Fortune 1,000 companies where personal computers are invading work places by the hundreds and thousands.

But today, the focus of concern in the big business-personal computer relationship is beginning to shift to a second, perhaps even more urgent, question: Will the union work? More importantly, will the once-

promising marriage ultimately prove a mismatch, leaving both sides permanently scarred and plunging them into discord?

The answers to the above questions may take years to fully reveal themselves, although some tantalizing clues have already begun to emerge and no doubt will continue to do so as 1984 progresses.

In the meantime, opinion on the subject remains sharply divided. Some industry observers—including Dr. Lew Glendenning, director of information systems research at San Jose, Calif.-based Strategic, Inc.—view the future of business microcomputing fairly optimistically. Citing the results of his own company's recent market research, Glendenning credits personal computers with already having cut large companies' costs, boosted worker efficiency and productivity and won "strong [user] support." He also cites fresh research findings to support the frequent vendor claim that

(Continued on Page 20)



MICROS AND THE END USER

(Continued from Page 19)
micros can make major inroads into the big business world's huge application backlogs — a serious problem that has defied solution for years.

Echoing Glendenning's optimism on the application backlog question is Connecticut Mutual Life Insurance Co. Vice-President Ted Stein, who bases his opinion on his own firm's recent

experiences with 1,000 networked IBM Personal Computers. "Many of the programs that corporate computing departments have never gotten around to developing are small and personal and are the sort of thing that end users could frequently do themselves," he said.

"So if they have the right hardware and software tools at their disposal, users

will be able to ease the application backlog because they know the subject matter in question much better than any programmer or systems analyst."

Not everyone, however, views the future relationship between large corporations and personal computers quite so rosy. One such skeptic is independent DP consultant Gopal Kapur, who foresees an impending

information systems crisis unless big businesses speedily supplement their microcomputer acquisitions with significantly improved management techniques.

For years, Kapur said, most large user organizations have woefully neglected to impose strict standards and sound management procedures on their in-house software development operations. The

unfortunate result has been programming projects that all too often exceed their budgets, miss implementation deadlines and produce systems that either reek with errors or fail to work as expected.

Although the absence of standards and effective management has caused a lot of grief, the situation offers at least one minor consolation: Because most programs until recently were written exclusively on mainframes, with all their inherent inefficiencies, systems-related catastrophes could usually be counted on to develop at a reasonably sedate pace. But with the recent proliferation of micros, the speed with which applications or data can go seriously awry has been dangerously accelerated.

"It's a little like having a barker person running around inside your organization," Kapur said. "If you give the person a baseball bat, he could hurt a lot of people. But think how much more harm would be done if you gave the same individual a machine gun." Thus, in the absence of adequate control over software-development activities, personal computers threaten to aggravate greatly the very problems they were expressly designed to solve.

The mass importation of microcomputers into the big business arena may also stimulate another potentially harmful trend — an increased willingness by nontechnical end users to "decouple" themselves from their corporate MIS organizations, Kapur said. After years of abuse and neglect at the hands of their DPs, many users are increasingly looking to micros as their deliverance.

Another personal computer problem that will grow in importance during the coming year is the issue of end-user training, which many corporations thus far have merely neglected, according to Microcomputer Managers Association founder James Hiner. Sounded by a recent spate of television advertising campaigns, many computing novices have been misled into believing that they can learn to use their micros in a matter of minutes.

If the training issue is not addressed, commercial personal computers may receive "only about one hour of use per month rather than 10 hours every week," according to Aaron Goldberg, research manager for International Data Corp. of Framingham, Mass.

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Personnel at Regimental Scales		25.8	42.9
Quantity	Total	5012	57509
\$ Amount	Total	13787.00	27071.22
Personnel at Regimental Scales		78.7	29.8
Quantity	Total	None	5131
\$ Amount	Total	7428.24	9904.05
Personnel at Regimental Scales		15.0	17.2



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MICROS AND THE END USER

Will Apple Steal IBM's Micro Mart Thunder?

By Tom Hénkel

CW Staff

IBM dominated the microcomputer market during 1983. And it will probably do the same in 1984.

In addition to major IBM announcements, such as the 5270 Personal Computer and the Personal Computer XT/370, the Personal Computer and Personal Computer XT were doing so well that IBM could not keep pace with the demand.

The situation spawned a host of vendors willing to manufacture anything that could be plugged into an IBM micro, including IBM-com-

patible disk drives, memory expansion boards, printers, plotters, tape drives and keyboards.

By all predictions, 1984 will bring much of the same. But Apple Computer, Inc. may try to steal IBM's thunder.

For Apple, 1984 may be a make-or-buy year. While IBM has been wallowing in the success of its Personal Computer, sales of Apple's latest entry, the Lisa, have been less than impressive. Prospective buyers have shunned the Lisa, considering the machine is too expensive, is incompatible with current Apple systems and does not offer

easy access to IBM mainframes.

According to Michael Killen, president of Strategic, Inc., a Santa Clara, Calif., market research firm, IBM's success — and Apple's lack of it — is a classic case of good product marketing over bad.

According to Killen, Apple made an incredible blunder when it announced the Lisa, a processor that originally cost about \$10,000 (it now costs about \$8,000). Current Apple users could not upgrade to the Lisa, and new users were hesitant to make a heavy investment in a machine that did not offer IBM compatibility, he explained.

"The Lisa is going to dangle out there," Killen said, comparing the processor to the earlier, somewhat ill-fated Xerox Corp. Star, an intelligent workstation that offers capabilities similar to the Lisa, including multiple windows and business graphics. The Star was announced in 1981 with a \$16,000 price tag. So far, industry watchers agree, the Star has not been a successful product for many of the same reasons the Lisa has not been a hot seller.

Noting that many corporate micro users also use IBM mainframes, Killen said, "I can't see any IBM shop getting involved with another family of machines, like Lisa, when it can buy a carload of machines for the [Personal Computer]."

Apple is expected to ring in 1984 with a flurry of product announcements, including the much-touted Macintosh. Some industry watchers believe the early 1984 announcements are Apple's attempt to lash back at IBM.

The Macintosh, according to Ralph Wagner, president of Microsource Financial, Inc., a Watertown, Mass., computer dealer, will do everything the Lisa can do for around \$3,000. Other industry watchers, such as Ted Corenson, a vice-president at Enlon & Associates, a Cupertino, Calif., market research firm, feel the Macintosh will be the entry-level Lisa now missing from the Apple lineup.

In either case, the Macintosh appears to offer Apple stronger ammunition for landing corporate accounts. The question is whether the Macintosh will meet analysts' and users' expectations and whether Apple can successfully market the device to raise corporate eyebrows.

Lisa Enhancements

Apple is reportedly planning enhancements to the Lisa. Corenson said planned enhancements include: a rewrite of the LisaDraw graphics package that is said to be four times faster than the currently available version; a revision of Apple's Pascal compiler; and the availability of Xerox's Smalltalk operating environment on the Lisa. The addition of IBM compatibility, such as a linkup to IBM's Systems Network Architecture, would also improve Lisa's image among corporate accounts, Corenson noted.

Apple's Achilles' heel appears to be a lack of presence in Fortune 500 firms.

"We've had the best year ever in terms of volume with Apple," Wagner said. But he quickly noted many of those sales were to public schools and not corporations.

However, IBM has its problems, too. While IBM appears to have gained control over the largest corporate microcomputer accounts, "there is an absolute finite supply of products from IBM," Wagner said. Pointing to the almost weekly announcements of IBM-compatible microcomputers, Wagner said IBM's delivery problems tend to give competitors about a year to develop competing products.

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Micro-Mainframe Links



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Making the Connection

By Paul Gillin

The wait is almost over.

The micro-mainframe link — the great software buzzword of 1983 — is set to become a widespread reality in 1984. Rarely has a single software technology so captured the attention of the computer industry. And probably never before has a largely unavailable technology been the subject of so much anticipation and speculation.

The micro-mainframe link was the subject of dozens of product announcements in 1983 by companies that included four of the top five independent packaged software vendors and both of the leading makers of microcomputer spreadsheet packages. However, with most of the products not scheduled to be

available until early 1984, the opportunity to evaluate the various approaches has not yet been realized.

The clamor for such products is not surprising. The 1982 installed base of 1.6 million microcomputers in corporate environments is expected to grow to more than 19 million by 1985, according to International Data Corp. (IDC), the Framingham, Mass.-based market research firm.

The user demand for access to business data has sent DP managers scurrying to find any way to tie micros into their corporate mainframes. International Resource Development, Inc. (IRD), located in Norwalk, Conn., predicts that users will spend more than \$500 million on micro-mainframe communica-

tions in 1984 [CW, Dec. 5]. An IRD study found that nine out of 10 Fortune 500 companies surveyed were either implementing or seriously studying programs in this area.

So far, the demand for link products has outstripped the ability of most vendors to respond with technically sophisticated offerings. The links announced this year have taken nearly as many forms as the vendors offering them. And while many claims have been made, relatively few products have actually been delivered. Those that have been unveiled are only a first step in what observers believe will be a flood of very sophisticated links that will become available over the next few years.

The end result may be a shakeout
(Continued on Page 25)

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- 59 *Inventory Survey*, Scott Dye
- 60 *Construction-Trade Federation*
- 65 *Public Utility Commission, Dept. of Transportation*
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- E. Office Automation Systems

MICRO-MAINFRAME LINKS

(Continued from Page 23) in the market for micro-mainframe links that could severely affect those vendors whose technology does not offer significant added value over and above the early "vanilla" links, which were essentially terminal emulators.

But despite the problems that lurk down the road, those vendors who deliver links this year have found them enormously successful.

Management Science America, Inc. (MSA), which was the first mainframe software vendor to enter the market when it introduced its Peachlink in December 1982, attributes more than \$5 million in combined mainframe and micro software sales directly to the link's introduction. McCormack & Dodge Corp., which began delivering its PC Link package in July, has chalked up more than \$2 million in sales of its link alone.

"Many users are buying our product without even looking at it," commented Robert Weller, McCormack & Dodge's vice-president of marketing. "They buy it because they like our company, and I'm sure the same applies to MSA."

Stamp of Approval

As in the personal computer market, it was IBM that legitimized the micro-mainframe link concept this year with its October announcement of the 3270-PC and the Personal Computer XT/370.

The 3270-PC, which is the more end-user-oriented of the two products, offers the ability to run concurrent applications from multiple mainframes in a terminal emulation mode using windowing techniques.

David Ferris, chairman of Ferris Corp., a San Francisco-based personal computing support firm, called the IBM 3270-PC "numerically the much more important announcement. Large companies have been holding off on [IBM] 3270 purchases and getting terminal emulators instead. But a lot of them would prefer to wait and buy that emulation directly from IBM."

The two announcements "have echoes that will be with us for a long time," added Thomas O'Flaherty, a principal consultant with Input, Inc. in Saddle Brook, N.J.

In addition to establishing itself as a vendor of a full line of communicating hardware, IBM has set a bar over which all other competitors must leap, O'Flaherty said. "This will have vendors worried because they'll always be a couple of steps behind IBM," he stated.

For the moment, however, competitors are welcoming IBM's endorsement of the linkage concept. "IBM is telling us people will want to access mainframe data, so it can't help but improve the market," McCormack & Dodge's Weller observed.

He believes the link market is beginning to resemble the packaged application software field of the late 1960s, when IBM's endorsement opened the door for independent vendors who provided improved functionality over the Big Blue offerings.

"The key for us," Weller said, "is to stay ahead of IBM technically and to offer attention to the individual customer. That's what made the independents flourish in the first place."

Four Categories

Micro-mainframe connections currently fall into four general categories, according to "Communications Software: Forging the Micro-to-Mainframe Link" from IDC. These include:

- Dumb terminal or terminal emulation, allowing

transfer and receipt of data in the host format.

- Data download, in which the data from the host becomes a file stored locally on the microcomputer.

- Information download, in which files are structured and formatted for a specific purpose.

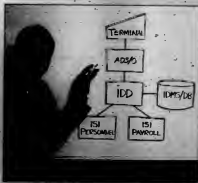
- Active information extraction, in which software

(Continued on Page 26)

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MICRO-MAINFRAME LINKS

(Continued from Page 25)
on both host and microcomputer allow the user to select the desired data.

A host of terminal emulation and download products are now available for nearly every large system and most micros. But the major announcements of this year have fallen into the latter two categories, with each vendor offering its own unique capabilities.

MSA's Executive Pack II, for example, allows real-time downloading of multiple "mini data bases" on MSA mainframe applications directly into a format that can be run on several popular micro-computer packages.

Data Extraction

Visiquester Answer/DB, a jointly announced product from Informatics General Corp. and VisiCorp, allows the IBM Personal Computer to extract data from a variety of different data bases. Applied Data Research, Inc. (ADR) and VisiCorp's Visiquest-based software integrates VisiCorp applications with 10 ADR mainframe products including data base management, decision support, program development and office automation.

Computer Corp. of America's PC-204 offers a transparent user interface and automatic reformatting of mainframe files on the company's Model 304 DBMS to run on Lotus Development Corp.'s Lotus 1-2-3. McCormack & Dodge's Interactive PCLink allows real-time uploading of Personal Computer files to update the mainframe data base.

Callinet Software, Inc.'s Personal Computer System features proprietary IBM Personal Computer software tied to an extracted data base on the mainframe, offering virtual mainframe storage, communication between microcomputers via the extracted data base and an indirect interface to other data base management systems.

These products give users a broad and diverse range of options from which to choose. Yet some significant shortcomings are already becoming apparent, observers say.

"The most glaring shortcoming is that they're not really out there," observed James B. Rothnie Jr., executive vice-president of Computer Corp. of America. "The shape of the market will be a lot different in 1984, after the users get some experience."

Satisfied With Less

O'Flaherty noted that despite vendor claims of technically elegant features, most users for the moment will be satisfied with far less. "Many people in DF are frightened of having users roam around in their on-line files, anyway," he said. "Right now the most important features are simple file transfers. We have to walk before we can run."

Mac Lewis, president of Systems Center, Inc. in Irving, Texas, pointed to the reliance of most links on terminal emulation as a fundamental weakness. "Most of the products are using the [Technical Anal-

ysis Corp.] Irma board, which allows the [personal computer] to plug via a coaxial cable into an [IBM] 3274 cluster controller," he said. "That limits the mainframe to having to deal with [IBM] 3270 data streams. All they can really transfer effectively is text-type information."

Lewis believes the next major innovation to come down the micro-mainframe pike will be a tie into IBM's Systems Network Architecture to allow loading of entire control blocks including binary data. Such a capability could overcome the problem posed by terminal emulation that requires data to be rekeyed or reformatting in order to fit

(Continued on Page 27)

Company	IBM Model (\$K)	Type of Company	Primary Products
Management Science America, Inc.	100	Applications	Accounting, Human Resources, Manufacturing
Informatics General Corp.	68	Applications, Program Design	Accounting, Business, Report Generation, DB-2, Program Design
Callinet Software, Inc.	68	Data Base	Query, Getting into Applications
Applied Data Research	59	Data Base	Program Report, Output, Data, Database Mail and Print Processing
University Computing Co.	52	Applications/ Data Management	Performance Measurement, System Man- agement, Program Support, Data Management, Accounting, Bank Manufacturing
McCormack & Dodge	39	Applications	Accounting, Human Resources
VisiCorp	35	Analysis Tools	Analysis
Informatics General	18	DBS	DBS
On-Line SW International	14	Program Design	Program Support, Program Design
Management Systems Software, Inc.	9	DBS	DBS

ISC Chart

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Intuition data communications products for the smaller system modems, statistical multiplexers field up to 32 channels, accepting mixed transmission speeds, mixed protocols, and asynchronous, synchronous and bit-synchronous inputs.

MICRO-MAINFRAME LINKS

(Continued from Page 25)
into the micro application. It could also allow applications to be exchanged between the micro and mainframe or other micros in object code without the need to recompile at either end, he said.

The IDC report points to the lack of a "universal" link as a potential future stumbling block. "There is no doubt that current announcements are attempts by vendors to preserve/extend/protect their current base of users," the report stated. "How long they will be able to hold out against the development of a truly universal link is open to speculation."

So far, the Informatics/Visicorp product is the only "intelligent"

link that attempts to meet that criterion. However, it is limited by the requirement that it run under IBM's IMS/DC teleprocessing monitor. The IBM 3270-PC is also a first step toward providing a link to disparate kinds of data. "The world badly needs a way of addressing various kinds of mainframe organizations," Ferris said.

'Untapped Field'

The micro-mainframe market of the future may evolve into one dominated by IBM or several independents offering a horizontal link to mainframe data bases. "There is an untapped field for generalized links," Rothnie said.

It will be complemented by many

independents selling links that include intelligent features built around individual packages. "The vendors of applications software, in particular, will have a niche because they can make it very easy for the data base administrator or the user to get at their data," Ferris commented.

Right now, the most important factor is time. With most of the major new link products due to be available within the next three months, users are just preparing to get their feet wet. A look back next year may reveal a new crop of untapped needs and yet another swing in the software market.

Link Products Spur Predictions

As the software industry prepares for the first round of reactions from users of microcomputer-to-mainframe link products, observers are speculating about some of the new issues that may emerge.

"In areas in which a lot of sensitive information is involved, the physical security of diskettes in the office will be an issue," predicted James B. Rothnie Jr., executive vice-president of Computer Corp. of America. "On a terminal, users see information in a very ephemeral way. They're not used to worrying about these things."

Education and training will become critically important as users start exploring the uncharted territory of the corporate data base, according to Thomas O'Flaherty, a principal consultant at Input, Inc. in Saddle Brook, N.J. "Users now look at MIS [management information systems] through a keyhole, knowing very little about what goes on inside," he said. "It's a heavy burden on MIS people to open that up."

O'Flaherty also believes mainframe software will begin to be modified to take advantage of the distributed processing power available on micros. "New technologies will make on-line capabilities on the mainframe less important," he said. "We'll see the industry evolve from batch to on-line back to batch again."

More friendly applications will proliferate on microcomputers, with windowing becoming a hot item, predicted Betty Fessor, product manager of the Personal Computer Products Division at Management Science America, Inc. Also, "from a corporate perspective, people will be looking for really superior service from vendors."

Security will become an issue, particularly as dial-up access becomes more popular among users, Fessor said. Another concern is that users will want to download too much data at first, highlighting the need for good training from DP.

Local-area networks could be rejuvenated by the micro-mainframe link, noted Robert Weiler, vice-president of marketing at McCormack & Dodge Corp. "One of the hotter areas will be networking personal computers to each other without going through the mainframe," he forecast.

today's picture in focus.

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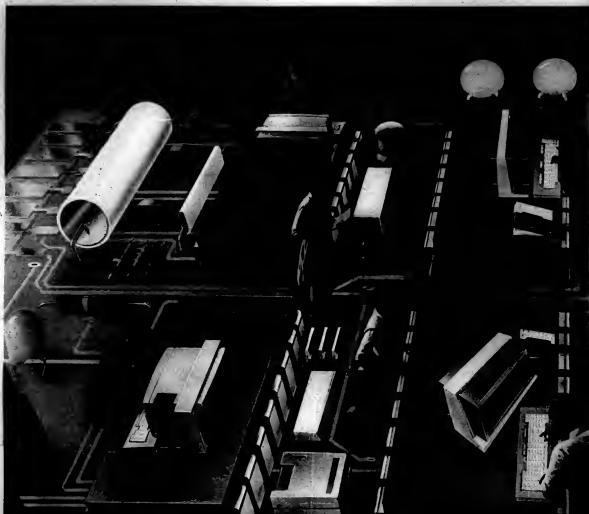
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IBM

IBM

King of the Road

By Bill Laberis

Why, man, he doth bestride the narrow world like a colossus.

— Cassius in Shakespeare's
Julius Caesar

A personal computer was absent from both the product agenda and the minds of most key strategists at IBM in 1980. But the following year brought a personal computer announcement; a few machines were shipped by year's end. In 1982, 100,000 personal computers bearing the ubiquitous blue initials left IBM's shipping dock; in 1983, 600,000 machines.

Bill Laberis is senior editor/industry at Computerworld.

In 1984, IBM will own a majority share of an exploding market where 36 months ago it had no product. To do so, IBM unflinchingly shattered a time-honored tradition in allowing outsiders to provide major components and software for its personal computer.

The action sent deep tremors rippling throughout the personal computer market, burying some of IBM's competitors and driving most of the rest to the relative safety of various market niches. But it soon became apparent that, in the personal computer market as throughout every sector of the computer industry, there is no safety.

IBM is leaving no stone unturned in its inexorable quest to control every area where it competes and, thus, control its destiny. Its quick work of the personal computer business yielded positive proof of both its intent and its ability to do so.

What is truly mind-boggling is the magnitude of IBM's mastery over the most vibrant and strategically pivotal sector of the world economy. To put the company's No. 1 position in proper perspective, consider that IBM will earn more profit in 1983 — about \$5 billion — than its closest U.S. competitor will realize in total sales.

IBM

IBM's maintenance revenues alone will be more than double the total sales of Digital Equipment Corp., which bills itself as the No. 2 computer company. In fact, IBM's revenues from a product it introduced just two years ago, the Personal Computer, are likely to exceed the total sales of its nearest competitor in 1984.

IBM Dominance

In short, no industrial company in history has approached the sheer dominance IBM has established over the markets in which it competes. No other company has wielded the power of IBM to legitimate such a broad range of products, methodologies and business practices. And few, if any, large companies have demonstrated IBM's uncanny ability to move so nimbly and quickly, completely re-vamping its organizational structure, manufacturing strategy and product mix, all since 1981.

"IBM will continue to play the wind in every arena of the market," said Michael Geran, IBM analyst with E.F. Hutton Corp. in New York. "They call the tune, and everyone else dances."

If it can be said that a mean and lean IBM put on the gloves in 1982, it follows that the company bloodied many noses in 1983 and will likely score major knockouts in the coming year. Companies that carefully chose markets where IBM maintained a low profile will find themselves fighting off Big Blue in their own backyards.

For example, with its 4300 series Glendale machines announced in September (CW, Sept. 19, 1983), IBM is targeting the scientific and engineering applications that heretofore had consumed so many high-end DEC and Data General Corp. superminis. According to Carl Amadahl, vice-chairman of Trilogy Ltd., "IBM is now able to provide a very cost-effective, high-performance machine that competes with off-the-shelf technology solutions found in today's superminis."

To complement this drive into the noncommercial market, IBM showed surprising versatility in announcing a significant OEM pact with Computervision Corp., the only company with greater computer-aided design and manufacturing revenues than IBM (CW, Aug. 16, 1983).

Equity Interest

Realizing it can't do it all alone, IBM is using others to spearhead thrusts into promising markets. It will use its equity interest (17%) in Rolm Corp. to ensure that it has an IBM-friendly private branch exchange to bring to the automated office. Its equity interest in Intel Corp., which has virtually paid for itself in terms of Intel's stock appreciation, ensures IBM a steady supply of Intel's coveted micro-

processors. And an IBMer on the boards of both Rolm and Intel will ensure that at least a portion of the companies' development efforts will have a distinctive IBM flavor.

After several years as the defendant in a fruitless antitrust suit brought by the U.S. Justice Department, IBM has taken the offensive in the legal arena. Japan, Inc. will reel for some time to come following the punishment meted out to Hitachi Ltd. for its part in stealing

IBM trade secrets.

Mitsubishi Electric Ltd. pleaded no contest in U.S. District Court to settle an industrial espionage case involving IBM software secrets. After being fined a paltry \$10,000, Mitsubishi revealed the real damage suffered: It announced it would delay its entry into the Japanese IBM plug-compatible market for a "few" years.

And IBM has warned its biggest competitor in Japan, Fujitsu Ltd.,

about possible copyright infringement, reportedly buying and analyzing a Fujitsu mainframe to carefully scrutinize the machine for copyright violations.

"It's getting to be a mean, ugly world out there, and it doesn't look like it's going to be quite so much fun anymore," according to William F. Zachmann, vice-president of International Data Corp. in Framingham, Mass. "The junkyard dog is on the loose."

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IBM

IBM Plug-Compatible Mainframers Fading

They were the "Great White Hope" of the computer industry just a few years ago, carrying to users a promise of liberation from the company that held the keys to the 370 instruction set.

Buoyed by favorable user opinion and led by a cadre of former IBMers, IBM plug-compatible mainframe (PCM) and peripherals makers successfully chewed into IBM's market share on several

fronts. Often they did so by offering superior technology at attractive prices.

Tracking the fortunes of the PCMs today is a fairly easy task, mainly because there are so few that are viable, at least without support from various Japanese partners.

Magnus Computer Systems, Inc. is mired in Chapter 11 proceedings, having been all but buried by IBM's 4300 series. Cambex Corp. ended fiscal 1983 losing

"IBM will no longer concede anything to the PCMs," said Charles Greco, market analyst with International Data Corp. in Framingham, Mass. "I'm not saying it's IBM's intent to bury every PCM. On the other hand, it won't bother them much if they do."

nearly \$2 million on ever-shrinking sales. Storage Technology Corp. (STC) has laid off scores of workers to counter weighty quarterly losses and is a full 18 months behind IBM in getting its 3380-type disk drive to market. Memorex Corp. has turned to making Burroughs Corp.-compatible disk drives to cover for sagging IBM-compatible sales. National Advanced Systems, Inc. has gotten out of domestic manufacture of IBM-compatible mainframes altogether. Upstart IPL, Inc. has suffered three consecutive quarterly losses, with no particularly bright prospects in sight.

Only Amdahl Corp., which weathered a very poor year in 1982, has enjoyed any measure of success selling into the IBM world. But there are questions about Amdahl's ability to deliver Extended Architecture capabilities as planned — and about the long-term future of a company that is largely single-product in nature.

Even the Japanese PCMs are feeling IBM's ire, and in very costly ways, as IBM has aggressively and successfully pursued legal paths to prevent the Japanese from freely duplicating its operating software and modifying it for Far Eastern applications, as the Japanese had done for years.

No Concessions

"IBM will no longer concede anything to the PCMs," said Charles Greco, market analyst with International Data Corp. (IDC) in Framingham, Mass. "I'm not saying it's IBM's intent to bury every PCM. On the other hand, it won't bother them much if they do."

IBM is "behaving like they want 100% of every market they compete in," agreed Jack Hart, IBM analyst at IDC. "And instead of worrying about who's going to sue them, they're out suing the competition, like National Advanced Systems, over secrets theft. Things have changed."

In brief, IBM has gained a tremendous competitive

advantage in recent years with a massive capital investment program that has made the company the quintessential low-cost, high-volume producer. Its participation in virtually every segment of the computer industry has enabled IBM to spread ever-increasing research and develop-

ment costs across several product lines, lowering per-unit costs. The PCMs — mainly single-product-line companies — cannot afford the initial capital expense needed to compete with IBM's production capabilities and don't have a range of products across which to distribute research and development costs.

In addition, IBM, with its early product support approach, has managed to withhold product specifications from its PCM competitors until it is nearly in the volume-shipment mode. This, coupled with changes IBM routinely makes during a product's life cycle, has

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put the PCMs on the losing end of a vicious cycle were.

● IBM announces and ships a product.

● The company gets a one-year-plus shipment jump on the PCMs.

● The PCMs announce their plug-compatible versions and initiate shipments, struggling to meet stated performance benchmarks within compressed development times.

● Responding to PCM me-too announcements, IBM slashes the price of its product, at this point having recovered most or all of its initial capital investment.

● The PCMs must follow suit, biting deeply into their profit margins.

● IBM announces the successor to its product, and the cycle starts anew.

"Clearly it is the IBM strategy to get out there in volume prior to the plug compatibles' ability to respond," said Carl Amdahl, vice-chairman of Trilogy Ltd., which hopes to leapfrog IBM technologically and ship a competitive high-end mainframe by 1985. "IBM has clearly come a long way regarding the way it will now compete with the PCMs."

Amdahl, who was Magnuson's technical chief during his brief heyday, said IBM is much more price-aggressive than it was a few years ago, giving customers significant price breaks when they purchase systems bundling IBM components exclusively.

IBM, Amdahl said, has also insulated itself from antitrust pressure by promoting itself as "the creator and defender of American, high technology and the only company capable of defeating the Japanese in the high-tech wars." Finally, he said, IBM has now caught up with and surpassed the technical expertise of its PCM competitors and has greatly padded its technological hand by acquiring stakes in other leading-edge suppliers like Intel Corp. and Rolm Corp. Amdahl predicted most of the same in 1984.

Jesse Aweida, chairman of troubled STC, said IBM's new-found aggressiveness has impacted companies in areas where it is competing in earnest for the first time. "The PCMs are used to fighting IBM," Aweida said. "We're dealing largely with very sophisticated users at the high end, and they look for value. That's what

keeps us alive."

Aweida, whose company also is hoping to leapfrog IBM technologically with an optical disk storage system, said it is not feasible for PCMs to compete against IBM across a wide range of products in both marketing and manufacturing. However, STC is mak-

ing an effort to crack the mid-range systems market, where, Aweida said, IBM has no competition.

"It has gotten tougher to compete [with IBM], mostly because they've become so price aggressive," Aweida said. "This trend will continue into next year and beyond, because they have

great ambitions.

"But remember, users don't want to be confined to one supplier, especially when the PCMs offer cost-effective alternatives," he added. "I wish people would stop writing about the PCMs like we're dead."

IDC's Greco sees the situ-

ation differently. "In the long run, only the Japanese will be able to compete effectively with IBM, and they might have to abandon the 370 architecture altogether to do it," he said. "The PCMs in 1984 will be more against the wall than ever. IBM's just too big and too good, that's all."

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IBM

What's Next in IBM's Product Strategy? Only

Second-guessing IBM's product and market strategies has become a tricky act in recent years.

Simply put, Big Blue has come to dominate so many sectors of the computer industry that its moves are dictated less by somewhat predictable external market forces and more by internal considerations of what is right for IBM. As one IBM watcher put it, "The worst thing for IBM's competitors is that IBM is no longer pressured into announcing anything. Almost without exception, the company does what it wants, when it wants, all in line with internal production schedules, capital requirements and the like."

"Guessing what they'll do is just that — guessing."

Nowhere was this independence more apparent in the past year than with IBM's November introduction of the PCjr, its low-end micro, which front-line analysts had picked for introduction at various times in March, mid-June, Sept. 15 and, finally, Nov. 1. IBM then defied virtually all predictions by announcing it would not actually sell the machine until well after the Christmas shopping rush.

Some Predictions

Notwithstanding a mind entirely its own, IBM is likely to make certain product and strategic announcements in concert with its stated intention to become a \$100 billion company by 1990. What follows is a compendium of what IBM might have in store for 1984, based on interviews with several IBM watchers, including Jack Hart, long-time IBM employee and now an IBM analyst with International Data Corp. (IDC) in Framingham, Mass.; Charles Greco, who tracks IBM, and the lease market in particular, at IDC; Robert Fertig, president of Enterprise Information Systems in Greenwich, Conn.; and Robert Djurdjevic, editor of the *Annex Computer Report*.

Here are their predictions:

● **A 3080 Series Successor.** With the lofty code name "Sierra," IBM's 3080 replacement will be announced sometime in 1984, with analysts divided between a second- and fourth-quarter announcement. Initial shipments would begin six months after the announcement, volume shipments three to six months later.

The machine will offer sizable price/performance increases over the present high-end offerings, perhaps in the range of \$200,000 per million instructions per second (Mips). Whether a clear migration path from the 3080 will be offered is questionable, with one source predicting an entirely new architecture followed by a "mini" VM/XA announcement. A single processor in the 15- to 20-Mips range is expected, with 30-plus Mips in the dyadic mode.

IBM will likely delay the announcement as long as 3080 order backlog remains healthy, which at present they are. The usual pre-

announcement signals — price cuts in the 15% to 20% range for machines like the 3081 Model Group K and 3084 — will come two or three months before the Sierra announcement, perhaps on two separate occasions. Clearly, any gains in market share that IBM realizes with increased 3080 sales in anticipation of Sierra will come at the expense of Andall Corp.'s 6860 and the high-end machines of National Advanced Systems, Inc.

But if 3080 sales continue at present levels well into 1984, a Sierra announcement may not appear at all next year. As one analyst put

it, "What's Sierra going to compete against? It will compete against IBM's 3080 series, that's what. They've got all the time in the world now."

● **Mass Storage Devices.** IBM's outrageously successful 3380 disk drive (more than 48,000 spindles shipped in 1983 with no visible competition) will be enhanced by a dual-density version offering about 1¼ times the storage at less than 1¼ times the price of the 3380. All signs point toward field upgradability of the 3380 to the dual-density model, while IBM will leave the door open to introducing a quad-

density version, perhaps in 1985.

Analysts concede that IBM owns the mass storage market and that plug-compatible manufacturers such as Storage Technology Corp. (STC) and the Memorex Division of Burroughs Corp. are in for a rough ride in the disk drive arena in the coming years (see story on Page 34).

Analysts state with somewhat less conviction that IBM will also announce a successor to its 3420 tape drive, a replacement that has been rumored for a couple of years. IBM dropped the 3420's price 20% in August.

matchmaker,

IBM Displaywriter & HEWLETT PACKARD Series 40 computer system & DATAPoint 1560 data processor & HONEYWELL Series 60 computer system & WANG System 35 word processor & Series 3003 word processor & NCR Conton 3670 computer system & PHILIPS Series 3004 word reeder & COMPU CORP 700 data terminal & HONEYWELL Series 62 computer system & RAYT & HONEYWELL microSystem 6/10" microcomputer & EXTEL B315 data terminal & AM JACO & DATAPoint 6600 data terminal & ANDERSON JACOBSON AJB33 data terminal & HONEYWELL DP & HEWLETT PACKARD HP 3000 mainline & PHILIPS INFORMATION SYSTEMS Model 2001E word process system & WANG System 30 word processor & PHILIPS 2002 Twin word processor & IBM P & JACOBSON AJ650 data terminal & TRS 80" personal computer & LANIER No Problem" word pr computer system & WANG 2200 computer system & APPLE IIe personal computer & AM JA & PHILIPS Model 2005 word processor & COMPU SCAN AlphaWord III" optical character reader & Series 44 computer system & NBI OASys 4000S word processor & EXXON 210 intelligent ty computer system & EXXON 120 intelligent typewriter & APPLE II personal computer & system & IBM Displaywriter & HEWLETT PACKARD Series 40 computer system & DATAPoint & VT 1300 word processor & HONEYWELL Series 60 computer system & WANG System 35 word pr & PHILIPS Series 3003 word processor & NCR Conton 3670 computer system & PHILIPS Serie & character reeder & COMPU CORP 700 data terminal & HONEYWELL Series 62 computer system & & HONEYWELL microSystem 6/10" microcomputer & EXTEL B315 data terminal & AM JACO & DATAPoint 6600 data terminal & ANDERSON JACOBSON AJB33 data terminal & HONEYWELL DP

IBM

IBM Knows for Sure

But there are some compelling reasons for IBM's not announcing a new tape drive, despite the fact that it would allow the company to recoup some of the tape market share it has lost to STC. One reason is that STC will not announce a new tape drive until after IBM does, because the STC version must be IBM-compatible to sell at all. By not announcing a 3420 successor, IBM essentially will deprive STC of revenues it would realize from quick sales of a competitive product, which STC is rumored to have waiting in the wings.

Nonetheless, the consensus is

that a 3420 successor will arrive in the second half of 1984, and it will be an 18-track, data streaming version.

● **On the Low End.** Louder rumblings of a 32-bit, multiuser system announcement have been heard, with some analysts speculating that IBM will make a concession to market pressure and announce full Unix support with the machine, called "Popcorn" at times. IBM is not now a dominant force in the low-end (20 terminals or less) multiuser market, accounting for only about one system in 10 shipped, compared with two of three main-



Hart



Greco



Fertig



Djurdjevic

frames. With few unplowed fields remaining, IBM may well announce significant products here in 1984.

● **Communications.** Seeking to attack its heretofore biggest customer, AT&T, before the communications giant can get its bearings in the competitive world, IBM will

helpen its communications interests in 1984.

A local-area network is inevitable, not unlike the proposed baseband token ring net IBM unveiled in Geneva in October [CW, Oct. 31]. AT&T has local-area network plans, too, but is keeping them more tightly wrapped.

IBM's local-area network will run initially on twisted pair media at speeds starting at 4M bit/sec, while combining the serial local-area network principle of a ring net with elements of a star configuration.

In concert with the aforementioned upgraded mass storage devices, IBM may enhance its 3880 controller to handle the new load requirements, perhaps including tape controlling capabilities if a 3420 successor is announced.

● **Leasing.** The byword for 1984 is, "Look out, third-party dealers, here comes the IBM Credit Corp., full steam ahead." Analysts believe that with a third financing partner—General Mills Corp.—in tow, IBM will offer such attractive lease rates that it will capture any deal it wants, leaving the third-party dealers fighting harder than ever to write attractive leasing deals.

Next year, IBM Credit Corp. will "handsomely compensate" IBM's sales representatives who steer lease customers to IBM Credit Corp. and not to third-party dealers, one source said. IBM Credit Corp.'s lease volume will reach \$1 billion next year, making it the largest lessor by far. The implications for users in 1984 are generally more favorable lease rates across the board, with third-party lessors at times taking greater risks than usual.

● **Business Strategy.** Growing from \$40 billion in sales to \$100 billion in seven years will be a Herculean task, even for a company 10 times larger than its nearest competitor. One growth path IBM will continue to follow will lead it to stake more minority equity positions in established companies, as it has done with Rolm Corp. (1% ownership) and Intel Corp. (17%).

Analysts polled settled on two broad areas in which IBM may be active in 1984 in minority stakes, robotics and software. However, none would speculate on particular partnership candidates.

Organizationally, IBM went from having seven to 18 independent business units in 1983, a trend likely to continue next year as the company continues to reap the rewards of carefully planned decentralization as it deepens its penetration across a broad range of market segments.

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COMPUORP 745 data terminal & CPT 8000 word processor

rd processor & COMPUSCAN AlphaWord Series 80* optical

HEON VT 1200 word processor & HEWLETT PACKARD Series 64

UARD J500 minicomputer & EXTEL B318 data terminal &

6 minicomputer & ANDERSON JACOBSON AJ830 data terminal

& EXXON 140 intelligent typewriter & UNIVAC* 1100

sonal Computer & PHILIPS Series 3000 word processor

cessor & NCR Contan 3690 computer system & HONEYWE

QUARD J425 word processor & COMPUORP 655 data terminal

& AM JACQUARD J600 multi-station computer & HEWLETT

ewriter & NCR Contan 3650 & NBI OASys 3000S word pr

ANDERSON JACOBSON AJ650 data terminal & WANG VS 80.com

IT 1560 data terminal & AM JACQUARD J100 minicomputer

cessor & COMPUORP 745 data terminal & CPT 800Q word

3004 word processor & COMPUSCAN AlphaWord Series 80*

& RAYTHEON VT-1200 word processor & HEWLETT PACKAR

UARD J500 minicomputer & EXTEL B318 data terminal &

6 minicomputer & ANDERSON JACOBSON AJ830 data terminal

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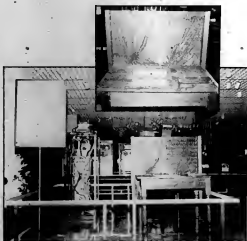
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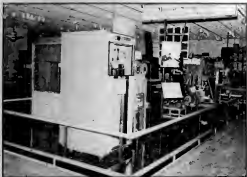
An IBM Look at the



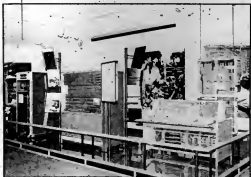
1 Start of the Industry (1890s) — Electromechanical machines were the heart of info processing through 1940s. (Insert) Punch card machine by Herman Hollerith.



2 Wires, Wheels and Levers (1890-1946) — The beginning of modern data processing. (Insert) IBM 077, an early collator.



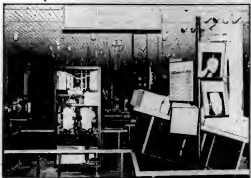
4 Magnetic Storage (1952-1964) — The answer for large-volume storage was the magnetic disk, enabling users to retrieve information directly, in less than a second.



5 Transistors (1957-1964) — Smaller, Faster, More Reliable. As a vacuum tube replacement, the transistor cut the time needed for electrical pulse circuits.



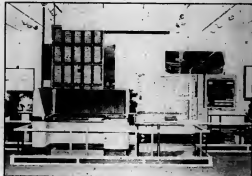
7 IBM 370 (1970s) — Faster Solutions to More Needs. The first computer with an entire main memory of monolithic technology.



8 IBM 3084 — Very High Densities (1980s) — More Speed, Function, Capacity, Reliability.

History of Computing

Photos by Lynn Haber
Text by David Myers



3 Vacuum Tubes (1946-1958) — The basis for the electronic computer, permitting calculations several thousand times faster than electromechanical relays.



6 IBM 640 (1964) — The First Big "Family" of Computers. This system incorporated new solid logic technology.



9 Today — Higher Productivity, Lower Cost.

The history of computing is in many ways the history of IBM. From the punched-card reader invented by Herman Hollerith for the census of 1890 to the newly unveiled PCjr home computer, IBM scientists and engineers have developed enough gadgetry for 10,000 patents.

A simple selection of these would make an impressive exhibit of computer technology — and that is what IBM created in a recent exhibit at its new Gallery of Science and Art on the ground floor of its world headquarters building in New York. (The IBM gallery, located at 590 Madison Ave., changes its exhibits regularly. The museum is open free to the public Tuesday through Friday from 11 a.m. to 6 p.m. and on Saturday from 10 a.m. to 5 p.m.)

Known to American business enthusiasts as the company of the Watsons, IBM might just as fairly be known as the company driven by hundreds upon hundreds of largely anonymous computer engineers. From modest beginnings as a maker of punched-card readers and time clocks, IBM became a computer vendor when the five-ton Harvard Mark I, a so-called Automatic Sequence Controlled Calculator, was installed at Harvard University in 1944.

Two years later, the first 100 production models of the company's 604, the first electronic calculator built around vacuum tubes instead of electromechanical relays, rolled off the lines in Endicott, N.Y.

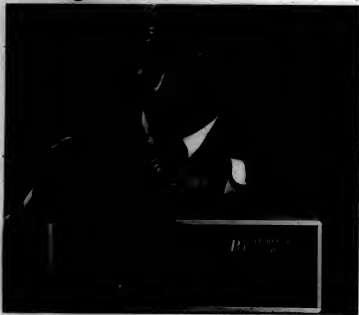
In 1948, when the firm installed the huge Selective Sequence Electronic Calculator in its headquarters on Madison Ave., IBM determined for years to come how the world would picture computers: room-size monstrosities of blinking lights — with 12,500 tubes and 21,400 relays — that dwarfed their operators.

Since then, computer technology has progressed from vacuum tubes to magnetic-core arrays, invented by An Wang and F.W. Viehe and first introduced into widespread use in the early 1960s. Soon after came the transistor, invented at Bell Laboratories in 1947 and used by IBM in 1961 in its Stretch, a computer 75 times faster than previous vacuum-tube models, built out of 150,000 transistors.

In 1964, only four years after IBM had launched captive production of transistors, came solid-logic technology, capable of switching a current from on to off in 30 billionths of a second. Integrated-circuit technology made its debut in 1971 in the 370 line of mainframes, the first all-integrated-circuit machines delivered by IBM. Not coincidentally, the 370 also capped an effort begun with the company's 360 series to make all its equipment compatible — yet another concept that IBM pioneered.

Lynn Haber is a Computerworld staff writer and David Myers is Computerworld's New York correspondent.

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Your IBM CRT can communicate with ASCII hosts, like DEC, as if it was a DEC terminal. With a stroke of the key from your IBM CRT on your desk, you become instantly DEC-compatible. Your IBM terminal is now a DEC VT-100 CRT, thanks to the PCI 74D deconverter from Protocol Computers, Inc.

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If you'd like to hear more about how to make your IBM world non-IBM compatible, get a dialog going with PCI today. To start your conversation, here's how to speak the language.

Glossary:

ASCII (American Standard Code for Information Interchange). The language spoken by DEC, not by IBM (without PCI).

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tion. Used here as synonym for an ASCII host.

DECONVERTER (74D) Makes the

IBM 3270 world ASCII-compatible.

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modify an entire CRT screen of

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SDLC (Synchronous Data Link

Control). Line protocol for data

communications between IBM

systems and terminals.

SNA (System Network Architect-

ture). IBM's approach to data

communications networking.

SNA/SDLC IBM communications:

non-compatible with DEC (ASCII)

communications (without PCI).

SYNCHRONOUS High speed, high

cost data communications

technique.

PCI 74D Deconverter makes

the IBM 3270 world ASCII

compatible.

3274/76 IBM controllers which

support 3278s, 3287s in an

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3278/79 IBM's CRT and color CRT.

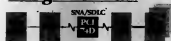
3178 IBM low cost CRT.

3287 IBM's printer.

All non-compatible with DEC

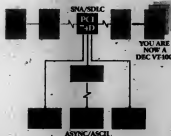
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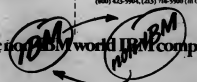
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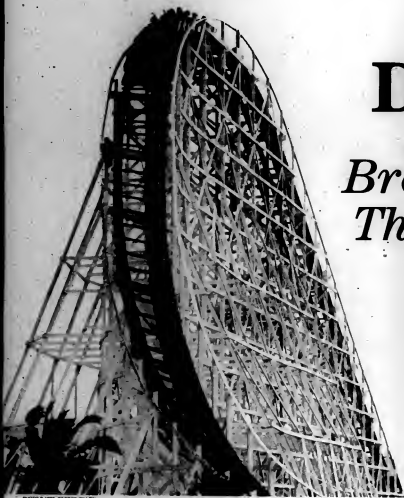


PHOTO © 1983, GEORGE COLLON

DEC

Breaking The Fall

By Peter Bartolik

The arrows flew from all sides in 1983 while Digital Equipment Corp. circled the wagons and hunkered down in decidedly bad humor. During a year in which the company was expected by some to renew its vigor, key executives left, earnings dropped and upstart competitors brought out faster machines.

The company struck a defensive posture, maintaining that nothing was wrong. But despite its protestations, it's beginning to look like DEC may go back to the basics in 1984.

Many people believed that 1983 would be the watershed year during which DEC would hone neglected marketing skills and mount a full-fledged campaign on the potentially lucrative business and office automation markets. The year was a watershed one, but not for the anticipated reasons. DEC announced in late October that first-quarter earn-

ings would be off sharply — following a 32% slide in fiscal 1983 — because of "administrative problems" in shipping microcomputers and delays in shipping computer disk drives for large machines. Following the bad news, the stock market chopped more than \$30 off the per-share price of DEC stock before it began to edge slowly back up past the \$70 level.

Financial analysts, many of whom had begun to back away from the stock, sounded betrayed, in light of DEC's previous forecasts, and quickly revised downward their estimates for the company's health in 1984. Stephen K. Smith, an analyst with Paine Webber Mitchell Hutchins and still a DEC booster, lowered his fiscal year 1984 earnings projection to between \$3 and \$4 per share, which would be the lowest level in many a year.

The finger pointing was fast and

furios; some said the company was befuddled by the aggressive moves of IBM, others said that the company lacked solid marketing skills. Some even insinuated that the company's management was past its prime.

No Charlie Chaplin

Talking to DEC President Kenneth H. Olsen, who has no intention of appointing a successor, one would think that 1983's problems were merely a bump in the road, an inconvenience that was overplayed by the nervous Nellies on Wall Street and the bloodthirsty hounds of the press. "You see, people who make these comments don't understand what marketing is," Olsen said in a recent interview with *Computerworld*. "They expect marketing to be Charlie Chaplin on television. [But] marketing is identifying your product and identifying your customer and bringing the

Peter Bartolik is a staff writer at Computerworld.

DEC

two together, and with our kind of product, we're after commercial, industrial, scientific and educational markets.

"This [marketing] often is not completely noticeable by the ordinary people who aren't our customers... We really haven't been too bad through the years, and people that consider us a marketing company ought to look at the results; we're not doing too badly. I think that's the measure. The measure isn't whether your mother-in-law in Idaho recognizes the name of the company.

"So, yes, we plan to be aggressive, and yes, we should be more aggressive, but no, our goal isn't to be noticed by the financial people or the press."

But the people who make the decisions on buying business computers and word processing equipment may very well be the people whose eyes are riveted on the latest TV antics of IBM's Charlie Chaplin look-alike. And the question has been asked whether a company that touts its highly technical spec sheets can sell in the burgeoning office automation market.

Frederick G. Withington, an industry analyst with Arthur D. Little, Inc., believes that in 1984 we will see "a considerable amount of refocusing" from DEC. "They'll be going back to their basic market." He quickly added, however, "that [it] doesn't mean they're giving up on office automation or the personal computer, it just means they realize there is more potential in their traditional scientific and engineering market."

Olsen claims that in the recent past the company has not lost an office automation contract in bids against the industry leader, Wang Laboratories, Inc., and that DEC probably has more word processing workstations installed than anybody else. But much of that installed base is in the markets of science and engineering where DEC has traditionally dominated.

"When it comes to the white-collar office, we didn't concentrate on that 'til the last couple of years, but we haven't lost an order to the leader in that business, [not] a single new order for a couple of years," Olsen said. "People already using somebody else's equipment have a tendency to continue to do so, but for new orders we don't lose."

Aaron Goldberg, an industry analyst with International Data Corp., doesn't feel DEC is ready to give up on the white-collar market. However, he concluded, "The move into the commercial markets is taking DEC a lot longer than it anticipated."

Won't Overrun IBM

In the area of microcomputers, DEC is going to bide its time and wait for the market to rise to the company's level, according to Olsen. With the announcement late last year of the Microvax I, a VAX-

11 superminicomputer on two micro boards, and the expected announcement later this year of the "VAX-on-a-chip," the company is developing sophisticated equipment for the sophisticated user who grows dissatisfied with the limits of lower end microcomputers.

"We're not going to overrun IBM [in the micro area]; we're not going to compete head-on with IBM," Olsen declared. "Our equipment didn't set out to get that broad market base, and so we're not going to go after that broad market they are. We're going after that segment

which maybe learned about computers with the less expensive, more computer-oriented machines [and now wants more power]."

But if DEC won't compete with IBM in the micro arena, that's not going to stop Big Blue from trying to claim a piece of the traditional DEC market. Olsen said he welcomes the challenge and is "flattered" by IBM's interest, but believes DEC offers unique services.

However, IBM's move into DEC territory has "already happened," according to Withington, who said that DEC is not fully prepared to wage war with IBM. "DEC needs

better technology. [Its] electronics are not as modern as IBM's."

On the other hand, DEC is not entirely defenseless, Withington acknowledged. "In the eyes of a considerable number of users, DEC has superior software, better cost packages and ease of use, and perhaps the company is more responsive. And its greatest asset is the number of people who have written software for the VAX."

IDC's Goldberg also believes DEC is well-equipped to maintain its market, but he expressed concern about the "exodus" of top and mid-

(Continued on Page 42)

OVER 500 SOFTWARE COMPANIES ARE AT



SOFTCON EXHIBITORS

(Continued from Page 41)
die management personnel, particularly from "projects" under way at the company. Most notable of the departures was the midsummer resignation of G. Gordon Bell, formerly vice president of engineering [CW, July 26].

Olsen practically bristles when he thinks of the published comments of unidentified former employees. "When the senior people left the company, I don't think any of them ever said bad things to the press. But some of the people who lost out at the more junior level don't know enough to keep their mouths shut, and the press often doesn't know enough . . . you [shouldn't] talk to people who either left angry or who didn't make it here, who failed here or were let go or . . . the press should be more sensitive."

If the company has more leaders than it can use, he added, that is a positive

sign that shows DEC is doing well; some personnel, he added, were with the company for a long time and simply wanted a different type of position or change of pace.

The 'Late' VAX

Another topic that ruffles Olsen's feathers is the suggestion that the high-end replacement for the six-year-old VAX-11/780 is late in coming. "The VAX computer is a very sophisticated computer. Because of all the features and details, it is very difficult to make it very fast, so from the start there have always been people who make simpler, faster machines. . . . We don't compete on speed, we compete on throughput and convenience [and] ease of use and those features."

Olsen claims that the products "we've got coming" make his job the most exciting that it has ever been. But the industry experts aren't so sure.

An Almost Mythical Giant

MAYNARD, Mass. —

Within the organization, Digital Equipment Corp. President Kenneth H. Olsen looms larger than life, an awe-inspiring mythical giant standing with one foot forward, gazing over the horizon. It's an image with which Olsen is apparently not uncomfortable.

During a recent interview with *Computerworld*, Olsen made it clear that DEC is his company, and in no way is he ready to turn the helm over to someone younger.

Asked if he had a team ready to take over when the time comes to go out fishing, Olsen replied: "Oh no, you never have a team ready, and I'm still too young to say we'll set a team up. . . . We have a number of bright people, [but] I'll probably never admit that they're ready to



Olsen at a Recent Meeting

Ch. 11a Photo

take over without me."

On his actual role, Olsen said: "If anything, I fail at not being the forceful decision maker. . . . Where we've been successful, we've broken down the pieces where people have responsibility, set the goals and measured them. . . . Basically, strategy is encouraged by me or teased by me, but it's the responsibility of individuals."

"And so far as making the market, I take an active part in teasing, showing, educating, but . . . the decisions come automatically. . . . It's making sure decisions get made, that's the job."

Departed Personnel

On departed personnel: "The people who have left us left for all kinds of reasons, and we would never make any comments about why. We would never say how many left because we encouraged them or how many left because . . . and most of them know enough to keep their mouths shut, too."

"Maybe the way to say it is, as friends and as colleagues for a long period of time, we miss them; but as part of the organization, it gives the opportunity for the bright, young people to move in and take these jobs."

On IBM's aggressive product strategy: "We have a head start there. We have the software, we have the machines, we have the products coming, so we feel flattered to have them show this interest."

(Asked if it isn't a problem to deal with the mystique behind the IBM name, Olsen replied, "Oh yeah, but it's a big market. We do those areas we feel we can

offer something unique in.")

On the challenges of younger superminicomputer manufacturers: "When people say there's three or four machines out there faster, our answer is there always have been, so [speed] is not what made [the VAX-11] the standard of the industry. It's fast, but there is always something that goes a little faster. So we won't admit that we've lost any of that market; we've always had competition there and probably will for a long time. We don't offer the fastest, simplest machine."

Trauma With Micros

On the trauma in the micro market: "The trauma which we went through bears no relationship to the trauma that others went through. We made some administrative mistakes, we call them administrative, and that really had little to do with our personal computer plans."

"Our first year, we probably shipped more than IBM did its first year. We shipped approximately what we had planned. There were different types of plans, different types of numbers, so that statement is not always consistent, you see. And we accomplished very much what our original plans were, although at times we had more ambitious plans."

"But the problem of most personal computers, I would assume, is that most of them are in the same market; they do the same thing. We, from the start, have been after a different market and a different level of quality. . . . So we feel our approach just takes a little longer to catch on."

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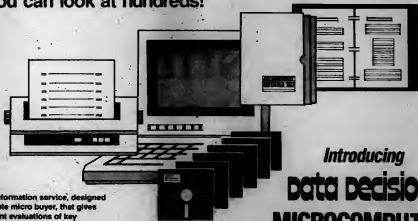
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The AT&T Divestiture

Hoping for the Right Numbers

By Phil Hirsch

Even though the Bell system will be broken up on Jan. 1, telecommunications users still do not have the answers to some important questions. Among other things, they don't know what message toll service, Wats and other heavily used communications services will cost after April 3.

That's the date on which the Federal Communications Commission's (FCC) new access charge plan may or may not go into operation, along with new rate tariffs filed by AT&T and the Bell operating companies last October. Congress strongly opposes the FCC access charge plan, and most corporate communications users strongly oppose the tariffs.

The access charge plan restructures the way local telephone companies will be reimbursed for the costs they incur in providing access

Phil Hirsch is senior editor/communications at Computerworld.

to the long-distance telephone network. Historically, this reimbursement has been made through "settlements" paid by long-distance telephone carriers. Other common carriers have basically paid a similar Exchange Network Facilities for Interstate Access charge. Altogether, this "interstate contribution" amounts to about \$6.5 billion annually.

Although tendered by carriers, the money actually comes out of their customers' pockets. That means it has been paid totally by long-distance communications users.

Since long-distance charges comprise a major part of most corporations' communications bills, business users are particularly eager to

reduce their part of the interstate contribution. One reason that's difficult is because the contribution includes a hefty subsidy that enables local telephone companies to keep down the costs of their local services.

The political consequences of this point became clear when the FCC unveiled its access charge plan a year ago and was immediately assailed by Congress, consumer groups and state regulators. The plan imposes a monthly surcharge on all users of the local telephone network, including those who make no telephone calls at all. The surcharge is \$2 per month for each residential subscriber's access line and up to \$6 per month for each business access line.

According to an analysis made by the House of Representatives' telecommunications subcommittee, the residential surcharge would amount to \$1.9 billion the first year the plan was in effect and \$3.6 billion in the plan's sixth year. In other words, about 30% of the annual interstate contribution would be shifted the first year from long-distance users to local residential users, while in the sixth year, about

(Continued on Page 46)





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THE AT&T DIVESTITURE

(Continued from Page 44)
55% of the total contribution would be shifted.

However, legislation now pending in both houses of Congress would bar the FCC from imposing surcharges on residential and single-line business users. If either bill is enacted, larger companies would supply a much bigger percentage of the interstate contribution than they would under the FCC plan.

The House bill (H.R. 4295) permanently bans residential and single-line business surcharges, while the Senate legislation (S. 1560) defers them for two years. The full House passed H.R. 4295 early last month; S. 1560 is scheduled for a final vote in the Senate late in January.

'Excellent Chance'

According to Herb Jasper, who probably spends more time tracking telecommunications developments on Capitol Hill than anyone else in Washington, D.C., there is an "excellent chance" the Senate will pass its bill. Jasper, executive vice-president of the American Council for Competitive Communications, an other common carriers' trade association, pointed out that the Senate bill is sponsored by a Republican — Bob Packwood (R-Ore.) — which gives it an edge in the present Republican-dominated Senate. Moreover, S. 1560 is less objectionable than the House bill to AT&T and bigger companies.

For the companies, the big advantage of the Senate bill is that it defers residential and single-line business surcharges for only two years, rather than permanently banning them. AT&T, meanwhile, prefers the way the Senate proposes to deal with the "other common carriers' differential."

Presently, other common carriers pay considerably less than AT&T for access to local telephone networks because the other common carriers get poorer quality interconnection. (One result: other common carriers' customers must dial more digits to set up long-distance calls.) During the next two years, however, as electronic switches come into wider use, this qualitative difference in interconnection facilities is supposed to disappear gradually. Under the House bill, the differential in access charges does not start to decline until the other common carriers begin re-

ceiving improved interconnection service. Under the Senate bill, however, the differential would drop precipitously the first year the FCC's access charge plan is in effect, thereby raising the other common carriers' costs and forcing them to raise their rates relative to AT&T.

Brian Moir, Washington counsel for the International Communications Associ-

ation (ICA), agrees with Jasper that there's a good chance S. 1560 will be passed by the Senate. He noted, however, that the Reagan administration and the FCC have joined the bulk of the telephone industry in criticizing the House bill directly and the Senate legislation by implication, so he thinks changes are likely before the measure reaches the president's

desk.

Moratorium Option

What sort of changes? Moir — who served six years as legal counsel to the House Commerce Committee and its telecommunications subcommittee before going into private practice — believes the House bill's total ban on residential and single-line business surcharges might be replaced

by a moratorium. To make this change more palatable to consumer advocates, the moratorium could be made longer than the two years specified in S. 1560 and could be phased in over more than the six years mandated by the FCC in its access charge plan.

In exchange, Moir said, the telephone carriers may have to accept the House-approved provision frees-



THE AT&T DIVESTITURE

ing the AT&T/other common carriers' access charge differential until the specialized carriers obtain better quality interconnection.

Rate Fight Certain

Even if the access charge battle is resolved on Capitol Hill, another fight over rates is virtually certain at the FCC.

Last October, AT&T filed new interstate tariffs em-

bodiment the FCC access charge plan, and the Bell operating companies — along with independent telephone companies serving non-Bell areas — filed tariffs specifying their terms for supplying access facilities. Initial comments on the Bell operating companies' tariffs were filed in November by about 80 organizations.

Because the carriers al-

legedly have failed to supply adequate information, "there simply is no basis on which the commission can conclude that . . . the estimated interstate access service revenue requirements are reasonable and reliable," said the Ad Hoc Telecommunications Users Committee, which includes such companies as Allis-Chalmers, Control Data Corp., General Motors Corp.

and Sears Roebuck & Co. "There is potential in the tariffs [for] enhanced service providers, shapers and end users [to] be subjected to unreasonable, discriminatorily high local service charges."

In its comment, the ICA noted that the user must order and pay for his access circuit long before he actually uses it. The access tariffs do not require local

telephone companies to make an inventory of access circuits, the association explained, so the only way a user can be sure of having facilities when he needs them is to file planned facilities orders.

Since planned facilities orders have to be placed at least 24 months before they are activated, "an interstate customer" must know fully two years in advance where its new facilities will be located, exactly what facilities it will need and, if applicable, where its customers will be located," ICA said. "Plainly this type of arrangement taxes even the most sophisticated forecasting systems."

The tariffs also require the interstate customer to prepay "one full year's monthly charges in three installments over no longer than the first 14 months following the order date," the ICA observed. "Payments are due on the last day of the specified month, and any payment not received by the exchange carrier by the end of the first working day of the next month would . . . cancel the [Planned Facilities Order]."

Most of the organizations commenting on the Bell operating companies' tariffs said the FCC should extend its investigation beyond April 3, the date the tariffs are presently scheduled to become effective. Given this consensus, it is believed that that is what the commission will do. Although the proposed rates would go into effect on April 3, they would be subject to change at the end of the investigation, and users might even get refunds. But because both the critics and the issues are numerous, the investigation is likely to take quite a while and ultimately end in court.

Buying Methods to Change

Besides changing the way users buy transmission services, AT&T's divestiture will drastically change the way they obtain terminal equipment. Local telephone companies, as well as AT&T Information Systems, AT&T's demerged subsidiary, will be selling, as well as leasing, new terminal equipment after Jan. 1. Users will have the option of buying or continuing to lease their already installed terminals.

In November, the FCC adopted a plan permitting this embedded base to be sold to its present users after divestiture. However, it is not yet clear what the

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THE AT&T DIVESTITURE

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sales price will be in every case. That's because the new owner of the equipment, AT&T Information Systems, does not plan to announce prices of several types of equipment until after Jan. 1, 1985. The list of equipment is broken down into some 20 equipment categories; it includes electronic private branch exchanges (PBX) (Series 700 and 800), data sets (Series 400, 600, 800) and various models of the Dataspeed 40 terminal.

How long users will have to wait for prices after Jan. 1 has not been specified. The FCC decision allows the company to wait until Jan. 1, 1986. AT&T said that "overall, it is estimated that roughly 75% of the

multiline customer premises equipment (CPE) base will be made available for sale during 1984."

For the long term, the most significant feature of the CPE decision is that it promises to give users more control over what they buy, when and from whom — thus achieving a goal the FCC has been seeking since the 1960s; the Justice Department's antitrust suit against AT&T had a similar objective. It isn't clear, however, that users will gain similar control over transmission services.

Although it will be quite a while in some cases before sales prices for some already installed terminals are announced, users will be protected by the fact that several

competing manufacturers offer similar equipment. The FCC order limits what AT&T can charge to rent embedded terminals between Jan. 1, 1984 and the date they are offered for sale. The order also limits what AT&T can charge to lease or rent terminals for a two-year period after sale prices are announced, thus giving users plenty of time to decide whether to retain or replace the equipment.

In the case of transmission services, the situation is much murkier. Not only are Congress and the FCC arguing about the commission's access charge plan, but telephone companies and their customers are arguing about the tariffs that implement that plan.

But there is another problem that may be even more significant.

Although AT&T currently carries over 80% of this country's inter-city communications traffic, and most observers do not expect that percentage to decline markedly for a long time, former U.S. Assistant Attorney General William F. Baxter told Congress he believes the intercity market is on the verge of becoming competitive. His view is significant because the Justice Department has primary responsibility for monitoring the post-divestiture behavior of AT&T and the divested Bell operating companies.

In Congress, meanwhile, and at the FCC, great sympathy is being explicitly and implicitly expressed for the Bell operating companies. One indication: both S. 1660 and H.R. 4295, the pending telecommunications bills, tax users who bypass their local telephone company networks. However, all of the operating companies significantly threatened by bypass services have the resources to upgrade their networks so that business customers will be discouraged from migrating to bypass technology, and many of them are building upgrade facilities right now.

In other words, it is questionable whether any help is needed from Capitol Hill.

Last month, the FCC decided that the Bell operating companies, after divestiture, must abide by a "modified" interpretation of the Second Computer Inquiry decision. That decision says, essentially, that if AT&T or any of its operating company subsidiaries markets "enhanced" services or terminal equipment, it must be done through separate subsidiaries on a deregulated, nonaffiliated basis.

Probably the most significant aspect of last month's FCC action was that three of the four commissioners who voted for it — Mark Fowler, Henry Rivera and Mimi Weyforth Dawson — did so reluctantly. They had expressed strong doubts about whether the divested Bell operating companies really need to be saddled with separate subsidiaries.

It is at least conceivable, though, that dimming the bright line separating regulated from unregulated services will enable the Bell operating companies to retain their present monopoly control of local exchange services. AT&T's long-distance monopoly may also be strengthened.

Ever since 1981, when Computer Decision II was issued, AT&T has been trying to do away with it. November's FCC decision could give this campaign a tremendous boost, particularly if, as seems certain, some Bell operating companies are allowed to establish unseparated divisions in place of separate subsidiaries.

As a result, it is quite likely the most important question facing the FCC and telecommunications users in 1984 will be whether Computer Decision II's bright line remains in place and preserves the limited competition achieved so far.



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White-Collar Crime

The Enemy Within

By Robert Batt

While the movie *War Games* and the recent spate of well-publicized computer break-ins have focused attention on the threat from outside hackers, the management information systems professional faces a potentially more damaging intrusion of corporate data from his own employees.

According to a recent report from the New York-based Research Institute of America (RIA), an estimated \$70 billion is lost each year to white-collar, computer-related crime, fraud and embezzlement, of which up to 75% can be attributed to insiders.

"DP-related crimes originating from within the company itself are by far the biggest part of the problem. For example, it is much harder for outside hackers to identify the vulnerabilities of a software system

than the insider who has access to the system for a much longer period of time and who knows the operating procedures of the company," commented Bob Abott, president of EDP Audit Controls, Inc., an Oakland, Calif.-based security consultant.

Since huge quantities of information are concentrated in one place, sensitive data can be easily copied or stolen, the RIA report, titled "Safeguarding Your Business Against Theft and Vandalism," pointed out.

In a world of large-scale data banks, information can be directly entered into a computer without any written record or proper authorization, and it can be changed without leaving any trace.

A dishonest programmer can bypass controls and surreptitiously enter information into the system, authorizing his own transactions,

RIA said. "Many records can be altered in a brief period. An embezzler can alter just so many written checks or records in a given time. Given access to a computer, however, he may get away with millions in minutes," the RIA report said.

Banks, for example, have been the victims of a swindle called "breakage." The dishonest employee, assigned to distribute interest to customers' accounts, programs the computer to deposit in his own account the odd fractions of a penny or dollar left over on many accounts. It's a difficult threat to detect, said Barry Bergman of the San Mateo, Calif.-based Barrick Security Group, because an audit reveals only that the correct total interest was paid.

"The audit trail is invisible. This makes checking and cross-checking of data more difficult for people

(Continued on Page 52)

Robert Batt is a Computerworld West Coast correspondent.

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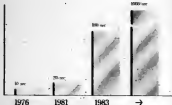
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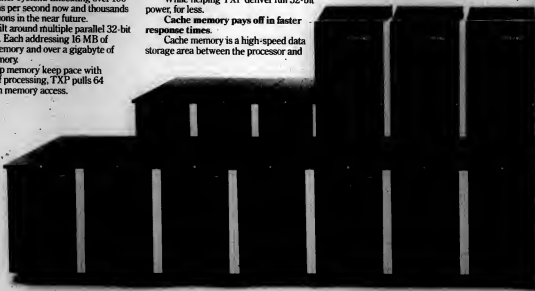
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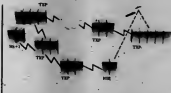
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WHITE-COLLAR CRIME

(Continued from Page 49)
used to dealing with ledgers and accounts," RIA pointed out.

According to Doug De Vries, computer security manager at Hewlett-Packard Co., as computer systems continue to expand and more people are connected to them, the risks of fraud and embezzlement increase, particularly through the use of comput-

er networks linking personal computers with corporate mainframe data.

Enormous Potential

"Within three years, with the use of micro widespread throughout the office environment, the potential for misuse of information will be enormous," he warned. Both Digital Research, Inc.'s CP/M system software and Microsoft,

Inc.'s MS-DOS operating system contain no passwords, and a would-be thief can copy what he wants, De Vries added.

In a recent speech to DP managers in Lake Tahoe, Calif., the HP executive declared, "Computer security is a growing problem because of the greater business dependence on DP. Vital corporate assets are involved, and distributed

systems are becoming more complex. There is good reason to be worried about threats to the continuity of the integrity of corporate information."

Added Peter Neumann, assistant director of the computer science laboratory at SRI International, Inc. in Menlo Park, Calif.: "When you now think of the number of on-line data bases that are accessible by

phone lines and the potential for altering critical data which could even threaten human life, you begin to shudder at the risks we are taking with inadequate computer security."

The RIA report noted: "Sensitive information can be stolen without anyone being present. A person at a remote terminal who knows how to bypass the codes and passwords can illegally retrieve information without leaving any clues to his identity."

Home Computing

The advent of home computing is going to add mightily to the problem, remarked Charlie Charlebois, director of international operations at the Tampa, Fla.-based security consulting firm of Stanley/Wacker, Inc.

Charlebois, a former Central Intelligence Agency staffer, said the introduction of home banking systems, for example, will confront data security managers with problems they have never had to face before.

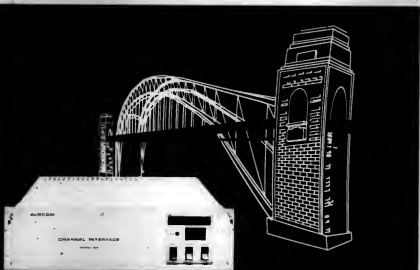
"There is definitely a danger in home computing because you have very little control, unlike security in your own building. Employees, particularly scientists and engineers, are now able to take classified information home, and the chances of abuse are markedly increased," Charlebois commented.

The explosion in microcomputers, while creating increased headaches for the computer security manager, offers the opportunity to increase corporate awareness of the need to protect corporate information and data rigorously, according to John O'Mara, executive director of the Boston-based Computer Security Institute.

"The theme for 1984 is the need to convey a sense of urgency. Awareness is the key to this problem. Security needs to have the [consent] of senior management, which will come out of the recognition that you can have protection without spending hundreds of thousands of dollars," he remarked.

For now, the battle appears to be an uphill one. According to De Vries, technology is the driving force in the computer field, with security desperately trying to catch up.

"It's going to be a tough business to be in, because as a security manager you are never going to catch up fully," the HP security manager concluded.



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WHITE-COLLAR CRIME

DP Crime: Where There's a Will, There's a Way

The first thing an industry expert will tell you about computer security is that no system is absolutely secure. When it comes to abusing corporate data, the old maxim of "Where there's a will there's a way," seems to apply to white-collar data processing criminals.

According to Peter Neumann, assistant director of the computer science laboratory at SRI International, Inc., "escalation" is the key word for those most concerned with denying employees unauthorized access to company data bases.

"Computer security is not a 100% thing. As systems improve, the types of security penetration will become more sophisticated and require more technology."

"While the likelihood of such a penetration is small, the risks are high, because in these days of corporate networks storing masses of vital information, it is the kind of crime that can destroy an entire company or even industry," Neumann attested.

The problem of trying to protect data from the unscrupulous insider is made even more difficult by the fact that many companies refuse to believe they have serious security problems. The "common reaction to business crime reports, consultants claimed, is, 'But our employees wouldn't steal.'"

Neumann's colleague, Donn Parker, senior management systems consultant at SRI, said that covering up a computer malpractice is also common because companies fear the effect of adverse publicity upon their businesses and future security efforts.

Parker has collected data on more than 1,100 reported cases of computer abuses.

"We believe that most cases of computer crime go unreported. Every computer security review we have done has revealed a significant number of computer-related losses that have not been 'reported,' he commented.

Specific Steps

However, many experts agree that a number of specific steps can be taken by corporations to protect their data from employee misuse.

According to Doug De Vries, computer security manager at Hewlett-Packard Co., several factors

should be evaluated in determining what security procedures a company should implement. These include:

- The role of computer systems in a company
- The asset value of DP resources.
- The impact of downtime on the people depend-

ing on the DP resource.

● Rating the scale of probability of information vulnerability.

● Providing protection to the appropriate degree.

"Users must consciously choose protection based on the level of risk rather than close their eyes and hope that disaster will not strike.

Ensuring the integrity of data is not free and, as a rule of thumb, 1% of a company's annual budget should be spent on data security," he urged.

De Vries outlined a number of specific actions a company can take to improve its security. These would include:

● Assigning a manager to deal with computer security who reports directly to the management information services director.

● Issuing written policies about security.

● Instituting regular, but unannounced, DP audits.

(Continued on Page 54)



Every company brings to the power of their computers, but very few about the performance of their service. They make a lot of noise about their hardware and software, but when it comes to service, they clam up, or promise what they can't deliver. Let's face it, very few companies have the resources to offer both a quality product and quality service.

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WHITE-COLLAR CRIME

(Continued from Page 53)

● Analyzing and implementing data security controls for the company as a whole, for specific data centers and programming groups.

● Developing computer security issues that involve the whole organization, not just the DP department.

In a recent report titled "Safeguarding Your Business Against Theft and Vandalism," the New York-based Research Institute of America recommended a number of procedures that can be implemented to help improve security. For example:

● All computer tapes and disks should be kept in a library where they can be logged out only with an authorized signature.

● Files should be classified in terms of their degrees of sensitivity to the company, with sensitive material being kept under lock and key in its own locations, accessible only to those authorized to work with the data.

● DP managers should insist on controlling the number of personal computer users and a log-in procedure for terminal users.

● Passwords should be carefully designed and controlled.

While creating a climate of awareness about the importance of security is an essential first step, technology must also play a role in deterring the would-be insider criminal.

According to SRI's Neumann, success in this area to date has been limited. "A great deal of research still needs to be done. Currently, there are small solutions for small problems, but there is no global solution to secure emerging technologies such as sophisticated computer networks.

Nevertheless, some progress is being made, industry experts claimed. Among the software security packages on the market are IBM's Resource Access Control Facility; ACF 2, developed by SIK, Inc. of Rosemont, Ill. for MVS, VSI and VM users and marketed by Cambridge Systems Group; CGA Software Products Group, Inc.'s Top Secret; and Security Access Control from Electronic Data Systems Group appear to be the most popular, according to the observers.

On the hardware side, dial-up/call-back security devices are available from Digital Pathways, Inc. of Palo Alto, Calif., and San Francisco-based Lermah, while Futurix Security Systems of Fair Oaks, Calif.,

specializes in microcomputer encryption devices.

Encryption, however, has yet to achieve market favor. Most companies, De Vries said, only want to encrypt 5% of their most sensitive information and view the techniques as expensive. Neumann of SRI agreed. "There is this naive view that all you have to do is encrypt everything," he said scornfully.

Voice-activated systems are now beginning to appear on the market. According to Research Institute of America in its report, one of the most interesting of these devices is a product called Computer Entry from Philadelphia-based manufacturer IBM Corp.

The product screens all calls from remote locations and allows valid callers to access particular files in

the computer. When the computer phone number is dialed, a digital voice asks for identification.

If an incorrect code or no code is given, the voice may either ask the caller to try again, allowing for the possibility that an authorized user made a dialing mistake, or the modem may be immediately deactivated, not to be used until it is manually turned on. A third

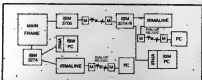
possibility is to have the device divert the call to a special phone in the data center for verification.

"While it's not clear to me that there are long-term solutions other than to continue to refine the computer operating software and architecture, manufacturers are slowly realizing there is a market for computer security devices," Neumann said.

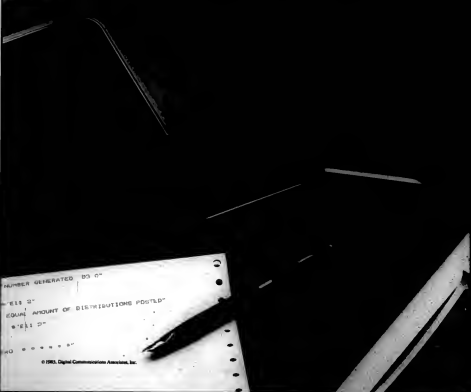
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WHITE-COLLAR CRIME

Security Message Often Falls on Deaf Ears

"If anyone assumes that they have a completely secure computer system, they really have their head in the sand."

That comment from Peter Neumann, assistant director of the computer science laboratory at SRI International, Inc., sums up the seriousness of the situa-

tion facing security managers as they attempt to strengthen protection of their data processing systems from internal misuse.

Yet getting senior management and department heads to admit that a problem exists in the first place is a major exercise in communication, industry ex-

perts agree. When it comes to instilling a passion for securing one of the company's most vital assets — information — the message often falls on deaf ears.

"In the corporate culture, most people do not recognize that data may be of importance to someone else, and so while they are

aware of the convention about security, in practice they do not do much about it," remarked security specialist Barry Bergman of Barrick Security Group.

According to Bill Stark, president of Stanley/Wacker, Inc., a Tampa, Fla.-based consulting firm, one of the most crucial areas

where security considerations are ignored is in hiring new personnel. "There is such a frenzy for people to be hired, particularly in a small high-technology company that is expanding rapidly, that managers do not take the time to do the checking on new employees and singling out potential risks," he said.

Once a company has been burned, Stark continued, they are reluctant to admit to a breach of security, especially in the financial community where such an admission can lead to a rapid loss of credibility and funds. "They don't want to prosecute in order to avoid the adverse publicity, and they even fail to inform other prospective employers if asked to provide a reference for the felon," he asserted.

In many ways, therefore, misuse of corporate computer resources is a hidden problem. "It is going to take a couple of really mammoth computer heists to galvanize opinion in the data processing community and prompt effective action," Neumann added.

The employees who turn out to be computer criminals are hard to detect in advance. According to Donn Parker, senior management systems consultant at SRI International, who has interviewed over 40 perpetrators of computer crime, they are white-collar workers who see themselves as problem solvers and consider themselves basically honest. They view the use of computers against a corporation as an intellectual challenge rather than a crime to be punished.

The New York-based Research Institute of America (RIA) has recommended a number of hiring procedures designed to identify would-be troublemakers. It recommends companies:

- Design an application form that provides enough detailed information to enable a manager to verify the applicant's statements and dig more deeply into areas not mentioned.
- Verify all information given, including academic and job background.
- Query references in person or by telephone rather than by a form letter.
- Bring in an investigator for preemployment screening of applicants for sensitive company positions.

A clear indication that
(Continued on Page 54)

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WHITE-COLLAR CRIME

Consultant Calls System Software Weak Link

While many experts agree that banking, financial services and brokerage houses are the most vulnerable sectors for internal data processing crime, it is in a company's system software that the true security weaknesses lie, according to Bob Abbott, president of EDP Audit Controls, Inc.

The Oakland, Calif.-based security consultant stressed that the key to secure data systems lies in increasing protection for the company's operating system and application software.

The former research worker at Lawrence Livermore Laboratory said that

many software programs have properties that reveal themselves to users over time, properties that were not intended by the authors. As a result, a would-be criminal is able to begin construction of a knowledge base that can be used to abuse corporate data.

In a book titled *Security*

Analysis and Enhancement of Computer Operating Systems, Abbott has outlined the glitches in system software that allow security intrusions to occur. These include:

- Incomplete and inconsistent parameter validation.
- Implicit sharing of

privileged or confidential data.

• Asynchronous validation or inadequate serialization, that is, timing errors brought about by the software itself.

• Inadequate identification, authentication and authorization of control access to software.

• Violation of prohibition or limit to software capabilities.

• Exploitable logic errors.

While radical improvements have been made in securing mainframe software over the past decade, he added, this knowledge base has not been applied to microcomputers.

"Many personal computers have been designed with many of the flaws that pervaded mainframe software in the 1970s, because the people designing the new systems have not been schooled in computer security problems."

"The question is: Does the design of that new system software take into account the lessons of the past decade in computer security? How is it to be tested?" Abbott said.

Abbott suggested, as one possible solution, the inclusion of a mandatory independent third-party statement attesting to the fact that a vendor's software meets industry-accepted standards.

Awareness Of Security

(Continued from Page 55)

the security problem is increasing comes from the Boston-based Computer Security Institute, which has seen its membership grow to more than 3,000 organizations in the last year. Its role is to emphasize practical, cost-effective long-term solutions to the problem of security through conferences and newsletters.

In order to generate more support for increased computer security, most industry analysts agree that senior management must get more involved. They must understand that no adequately secure commercial computer system exists today, based on the value of the data stored and the machine's processing capability.

Until more far-reaching progress is made, the potential for a major computer crime, bordering on a disaster, will persist.

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Computer Crime



A Worldwide Concern

By Susan Blakeney

So you think the U.S. has the market cornered on computer crime?

Think again. According to an international survey recently conducted by *Computerworld*, computer criminals are popping up just about everywhere there's a computer. While the U.S., because of the sheer number of computers within its boundaries, may still take dubious credit for the lion's share of computer-related transgressions (annual U.S. losses are estimated at \$100 million), some analysts say it's only a matter of time before the rest of the white-collar universe follows

America's lead and catches the computer crime fever sweeping the U.S.

Computer industry watchers from seven countries contributed to the *Computerworld* survey: Australia, Brazil, France, Italy, Japan, Sweden and West Germany. Six of the seven respondents agreed that computer crime was considered a major problem in their country.

In Brazil, the banking industry is especially vociferous on the subject of computer crime. While they offered no estimates on the dollars lost to computer invasions, Brazilian bankers are said to be scrambling to wage a counterattack.

In Japan, losses to date are estimated at \$30 million. In Sweden, au-

thorities maintained that the computer crime problem costs \$10 million a year — most of which they attribute to the illegal copying of software for resale on the black market. In West Germany, the average computer crime is valued at between \$200,000 and \$500,000, with an official annual figure unavailable at this time.

Then there's Italy, where "stealing is the way we do business," according to one industry expert there who requested anonymity. Here computer crime is considered a critical problem, but not as much as during the reign of the Red Brigade (the terrorist gang probably best re-

(Continued on Page 58)

Susan Blakeney, *Computerworld* international editor, is coordinator of the CW International News Network.

COMPUTER CRIME

nies use something called "avoidance security," a policy whereby no sensitive data can be committed to the computer's memory.

In Japan, it is generally felt that restricting access to the computer room with identification cards, restricting access to the system itself with user codes and restricting access to certain data files are suffi-

cient precautions.

DP Criminals

Just what kind of people are involved in these wrongdoings? The "hacker" (America's sobriquet for the amateur computer prankster) is not considered a major problem in other countries.

In West Germany, the survey in-

dictated that "90% [of computer crimes] are done by employees — the end users." This also rang true in the rest of the countries polled. Other potential criminals, in descending order of number of times mentioned, included: programmers, operators, bank employees and disgruntled employees. Japanese sources also mentioned "the titleholders in companies" as notable for being among the greatest offenders on the list of computer felons.

When asked if employers investigated people's backgrounds before hiring them, five out of seven respondents said yes, with Australia and Japan again dissenting. None of the countries polled, how-

ever, use polygraph testing during hiring; in fact, administering polygraphs is illegal in Australia and Sweden.

So what else is being done to combat computer crime? In Australia, extensive training courses are held for external auditors, special courses are conducted for fraud police; and the government has reportedly earmarked money for additional security training, the survey revealed.

In Japan, the police regularly hold conferences that address the issue of computer crime. Furthermore, 17% of all Japanese police offices are said to have implemented specific computer crime prevention (Continued on Page 60)

Love, Money Drive International DP Crime

Love and money, not necessarily in that order, are the driving forces behind the international world of computer crime, according to a recent worldwide *Computerworld* survey on the subject.

In Sweden, for instance, three computer executives were separately reduced within the last 18 months by Soviet women and summarily coerced into giving up defense secrets and classified information. (All three eventually committed suicide.) According to Ragnar Eriksson of the National Police Headquarters in Stockholm, businessmen are extremely naïve about computer espionage.

He urged employers to make greater use of psychological tests in order to predict a potential employee's psychological weaknesses.

In Japan, a 32-year-old bank clerk, at her lover's request, opened five different savings accounts under assumed names in five branch offices. She then began channeling funds into these accounts by entering "receipt of money" statements into the bank's computer system. After she accumulated over \$500,000, she withdrew the money and ran away with her boyfriend. Six months later, international investigators discovered and arrested her in the Philippines.

In Australia, the sting again mixed romance with finance. An operator at the New South Wales state-run horse betting agency was changing the time clock in the computer system by three minutes. After a horse race, he would quickly telephone his girlfriend, an input clerk, with the winning horses and the amounts to put down. Authorities still don't know how much money he embezzled with this technique, but he was betrayed by his lady friend when he ditched her for another woman.

In West Germany

And in West Germany, the culprit was a programmer at a large German stock company. With the help of a program developed in-house, he fed salary information on fictitious people into his own salary account in the company's payroll system memory.

To circumvent the checkpoints in a normal payroll system, the felon developed his program to change the payments in such a way that they would never appear on any master list, nor would they generate wage slips.

This fraud was discovered by chance, and the offender was sen-

tenced to jail for two years for illegally extorting \$75,000 from his employer, sources said.

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COMPUTER CRIME

(Continued from Page 59)
programs.

West Germany also has specially trained police officers to investigate computer fraud cases, and additional training is presently being planned, according to the survey results.

In Sweden, the Society for Data Processing established a task force to study matters of computer security, and one task force recommendation resulted in the establishment of an international body for

dealing with computer security within the cadre of the International Federation of Information-Processing Societies.

In contrast, "nothing in particular" is being done to formally fight computer crime in Italy, according to the respondent, and this is also true in Brazil and France.

A number of interesting responses were elicited when Computerworld asked the international participants what else can and should be done to ward off future comput-

er crime. The number one answer to this survey question, from six out of seven countries: Vendors should build more security features into their software.

Another suggested procedure, mentioned by more than half of the respondents, was tightening security in the work place. Participants in West Germany, Japan and Italy opted for harsher laws and better training programs for computer crime investigators.

The survey results from Italy

stressed the importance of preventive organizational measures, such as splitting up tasks in the application development phase, tight production management in the computer room and the introduction of a security manager at every company.

In Australia, "More control is needed over people — it's really a people problem," according to Fitzgerald. His recommendations included changing people's attitudes toward computer crime.

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Fifth-Generation Computing



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Who's on First?

By Tom Henkel

Driven by the quest for both economic and political strength, world powers are currently staging a quiet war.

In this war, the biggest and strongest will not necessarily have an advantage over the small and weak. A single person's idea may prove the deciding factor.

In this war—the war over which nation will be first to develop the next generation of computer systems—the battlefield is the laboratory.

Computers have become so vital that today it is almost impossible to live without them. Corporations

throughout the world would come to a grinding halt if they could no longer use computer systems. But perhaps the most important dependency on computer systems is for national defense.

Most world powers currently use sophisticated computer systems to design and control weapons. Without bigger and faster computer systems to build bigger and more effective weapons, some theorists contend, a world power could be rendered helpless in a few years.

It is for these reasons that thousands of researchers are working to unlock the mysteries of physics and electronics which will permit the development of new computer sys-

tems. The 1980s may be remembered as the time when computing ceased to be identified as an industry and became a political force.

The current challenge involves what has been dubbed the fifth generation of computer systems.

The U.S. and Japan are the two major players vying to be the first to develop this new class of machines. France and the United Kingdom also have ongoing government-sponsored research projects. In addition, countless researchers in other countries are working on individual projects that eventually could lead to significant developments in computing.

(Continued on Page 66)



**"EVEN BEFORE RAW
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VAX HAS OUR ENTIRE
MANUFACTURING
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*-Dr. Michael J. Randall, Vice President, Business
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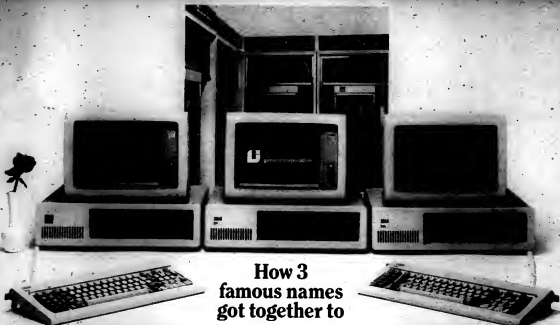
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FIFTH-GENERATION COMPUTING

U.S., Japan View Fifth Generation Differently

The U.S. and Japan are by far the front-runners in the race to the fifth generation. In many ways, the two countries are performing the same research; the difference between them is their philosophical approaches.

Traditionally, the U.S. has operated with the philosophy that business and government should maintain a polite distance. Business' job is to turn a profit; government's job is to enforce laws and collect taxes.

As a result, U.S. corporations have historically tended to focus attention on short-term projects. In many companies, a plan aimed at boosting next quarter's profits often gets more attention than a long-range plan which may not turn a profit for 10 years.

But when it comes to research, it is difficult to put a deadline on results. Consequently, a project with potential for a significant long-term pay-back may be pushed aside in favor of other projects.

Also stifling U.S. development of a new generation of systems is the market for such systems. The biggest profits appear to come from highly popular computer systems — units which will sell in the thousands, as opposed to a handful.

Many U.S. computer companies make use of large semiconductor houses, such as Motorola, Inc. and Fairchild Industries, Inc., to supply logic chips, memories and other components such as gate arrays for their processors. For the semiconductor houses, profits come from selling current items such as microprocessors rather than from developing new technologies.

To combat this trend, the U.S. Department of Defense's Defense Advanced Research Projects Agency (Darpa) has announced plans to pump money into various universities and companies to fund artificial intelligence research projects. However, the focus of the research project must be aimed at defense rather than at commercial applications.

A Darpa spokesman estimated it would spend about \$50 million by the end of 1983 on assorted artificial intelligence projects at the business and university levels. The spokesman also pointed out that while Darpa is funding defense-oriented projects, a technology developed for a defense application can often be easily adapted for use in a commercial project. Darpa intends to make the technology developed under its funding available to industry.

Some Solutions

Control Data Corp. has found a way around the problem of funding projects with long-term rather than short-term payoffs. The firm recently allowed two of its top supercomputer architects, Neil Lincoln and Lloyd Thorndyke, to form their own company, ETA Systems, Inc. (CWA, Aug. 22.)

According to CDC Chairman William Norris, the two started their own company with CDC's blessing because CDC could no longer budget enough money to support adequately a supercomputer research project.

Of the U.S. computer makers, only IBM, which reportedly spent \$3 billion in 1983 on research and development, appears able and willing to fund the major research projects necessary to produce a new generation of processors, noted Dr. Al Brenner, head of computing at the Department of Defense's Perimeter Laboratory.

The quest for a U.S.-developed fifth-generation processor has an entrepreneurial flavor. Perhaps the most publicized effort has been that of the Microelectronics Computer Corp. (MCC), a research consortium of nine high-tech companies led by the former head of the National Security Agency. (Not Adm.) Bobby Inman. MCC was formed through the efforts of CDC's Norris to develop a high-tech research consortium.

In addition to CDC, other mem-

bers of the consortium include: Honeywell, Inc.; Micro Devices, Inc.; Mostek, Inc.; NCR Corp.; National Semiconductor Corp.; Sperry Corp.; Allied Corp. and Rockwell International Corp. MCC recently chose Austin, Texas, for its headquarters (CWA, Dec. 10).

Thinking Machines, Inc., a Waltham, Mass., group of MIT researchers, is pooling the expertise of several leading experts, including one of MIT's leading artificial intelligence researchers, Marvin Minsky, to work on new technologies. Both MCC and the Thinking Machines organizations are still in the formative stages and neither, at this point, has produced concrete plans for research.

In an effort to produce a faster supercomputer, three research organizations — Los Alamos National Laboratory, Lawrence Livermore Laboratory and SRI International, Inc. — have formed the Supercomputer Project Research Experiment for Research and Development (Spread), which hopes to develop a supercomputer 1,000 times faster than currently available processors. While American scientists contend that supercomputers should not be included in mention

of the fifth generation, their presence is essential for at least the design and testing of new systems. Others also contend that supercomputers will eventually become an integral part of new technology processors, performing the number-crunching segments of complex problems.

In addition, leading universities such as MIT, Stanford University and Carnegie-Mellon University are working on individual projects that may contribute significantly toward development of a fifth-generation processor.

Although U.S. research efforts are operating independently, Dr. Paul Schneck, a researcher with the Office of Naval Research in Washington, D.C., noted the fragmentation may offer the U.S. a benefit over other countries because many different avenues are being explored.

"I don't think any of us has the right answers at this point," Schneck said. He pointed out that while there is redundancy in the U.S. efforts, there is less chance the U.S. will wind up throwing all its support behind a project which in the end proves impractical.

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FIFTH-GENERATION COMPUTING

(Continued from Page 61)

What exactly is a fifth-generation processor? Ironically, the term may not be concretely defined until someone actually makes one — perhaps 10 or 20 years from now. Currently, however, the term is being used to represent a genre of processors which exhibits significantly enhanced capabilities over currently available systems.

Dr. Al Brenner, head of computing at the U.S. Department of Defense Fermi Laboratory in Batavia, Ill., contends a fifth-generation processor is one capable of sophisticated artificial intelligence. Such a machine would execute logical, as opposed to mathematical, calculations.

However, John P. Riganati, a researcher with the U.S. National Bureau of Standards, notes the Japanese have defined the fifth generation to be a series of processors which, when available in the 1990s, may give Japan a stronger position in the electronics industry. Under that definition, a fifth-generation processor could include ar-

ithmetic intelligence processors or the high-speed, number-crunching processors known as supercomputers.

In contrast, American scientists seem to agree that new versions of supercomputers should not be included in the definition of fifth-generation processors. Newer versions of the supercomputers that

exist today, such as those produced by Cray Research, Inc. and Control Data Corp., while they may employ vastly different technology, will function in basically the same manner and, thus, do not qualify as a new generation, the scientists say.

But researchers like Brenner admit the distinction between supercomputers and artificial intelli-

Japan's Approach to Fifth Generation

Unlike the U.S., which is taking a fragmented approach toward developing a fifth-generation processor, Japan is performing research in a highly controlled fashion.

With its Ministry of Trade and Industry (MITI) as a coordinator, Japan has focused the efforts of several government-sponsored projects, such as the Institute for

New Generation Computer Technology and the Japan Information Processing Development Center, to work toward some commonly held goals. Each of the projects has a nine- to 10-year life span aimed at producing results sometime around the end of the century.

Japan's strong government control allows for focusing the research on several tracks. John P. Riganati, a researcher with the U.S. National Bureau of Standards, noted that the Japanese fifth-generation project, for example, is designed around 27 projects centering on seven major themes.

The benefit of this targeted approach is that Japan appears to have made the next generation of computer systems a national goal, uniting various forms of research and even some fierce competitors. The disadvantage, according to Paul Schneek, a researcher with the U.S. Office of Naval Research, is that tight governmental control may leave Japan with too narrow a focus.

Still relatively new, none of the Japanese research has yet produced a significant technological breakthrough. However, some Japanese members under the MITI umbrella, such as Hitachi Ltd. and NEC Information Systems, Inc., have announced supercomputers that appear to rival those produced in the U.S.

Some experts, including Schneek, contend that Japan is riding a no-wave wave. Even if it cannot meet its proposed 1990s goal for developing a new generation of processors, Japan will undoubtedly develop useful technologies as a result of the MITI-controlled research. Other observers added that MITI has already succeeded in breaking a long-standing stereotype about the Japanese — that they are masters at observing and copying the technologies of other countries, but lack the expertise to produce new technologies domestically.

Another advantage of the MITI approach is that it has made more readily available to scientists and researchers at the university level tools such as supercomputers, which are vital to developing and testing new technologies and circuit designs.

Schneek noted that relatively few U.S. researchers have ready access to supercomputers or the expertise to use them.

But the U.S. government has made an attempt to make more heretofore classified supercomputers and other resources available to researchers, he added.

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FIFTH-GENERATION COMPUTING

gence processors can be somewhat muddled by research that makes use of both logical and mathematical processing capabilities.

Many researchers are currently working to develop huge multiprocessors which incorporate many subsystems. Some, such as John Finston of the National Security Agency, have gone so far as to predict that computer systems may someday occupy the space of a small city, with thousands of processors linked together. Such a pro-

cessor would manage its own workload, distributing tasks to the most capable components of the system.

Three Fronts to the Battle

Although an exact definition of fifth-generation processor is lacking, research is currently being conducted on three fronts: processors capable of performing artificial intelligence functions (such as expert systems, natural languages, visual and voice recognition and computer-aided instruction); supercom-

puters, and multiprocessors.

Technical problems appear to plague all three technologies. Dr. Paul Schneck, who is with the Office of Naval Research in Washington, D.C., recently pointed out that designers of computer systems have exhausted the obvious methods of increasing computer processing power. "Since we began building computers 30 years ago, there has been an order of magnitude [in speed increases] every half-dozen years or so." Now, researchers are

facing the possibility that computer speed cannot be increased by technological advancements alone.

Scientists will have to resort to better packaging techniques and more efficient processor designs to boost performance, Schneck said.

All this research takes time and costs a phenomenal amount of money. IBM and Bell Laboratories have each spent millions over the past 10 years researching Josephson junctions, circuits which when cooled to near absolute zero lose virtually all resistance and allow dramatically increased switching speeds. In recent months, both organizations decided the Josephson approach is not practical for commercial systems and significantly cut back research [Nov. 14, 1983].

High risk and astronomical cost have driven many other computer makers away from serious research to develop the next generation of processors: The high cost has also curtailed some university research. To solve this problem, the governments of various countries have actively begun funding research projects. Perhaps the most popular of these is Japan's Ministry of Trade and Industry, the U.S. Department of Defense's Defense Advanced Research Projects Agency and the European Strategic Program of Research in Information Technology.

Europe Still at Starting Gate

If the quest for the fifth generation of computer systems was a horse race, some observers at the track would contend that European entries are still at the starting gate.

The European Strategic Program of Research in Information Technology (Esprit) is the only major cooperative effort among European high-technology firms to share research and development efforts. Still in the formative stages, the organization appears to have identified four major areas — microelectronics, artificial intelligence, office automation and computer-assisted manufacturing — as its focus.

Like Japan's Ministry of Trade and Industry (MITI), Esprit has given itself 10 years and a budget of

upward of \$800 million to set new technologies in motion.

Government-Funded Projects

In addition, individual countries, principally France and the UK, have ongoing government-funded research projects which may yield technological developments that could influence fifth-generation architectures.

France's Ministry of Defense, for example, currently has two ongoing projects. The project dubbed Marianne is a supercomputer project aimed at developing a larger vector processor; Isis is a project aimed at linking multiple minicomputers into a multiprocessing system, according to Dr. Paul Schneck, a researcher with the Office of Na-

val Research.

Project Marianne is a proposed project that will combine the results of the Marianne and Isis projects, possibly to form a vector multiprocessor.

UK officials are at the present time studying a recently produced government report that looks into the viability of a fifth-generation project.

Dr. Jim Howe, leader of artificial intelligence research at Scotland's University of Edinburgh, noted that his institution has several ongoing projects, which yield advances in use of the Lisp and Prolog artificial intelligence languages.

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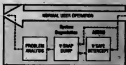
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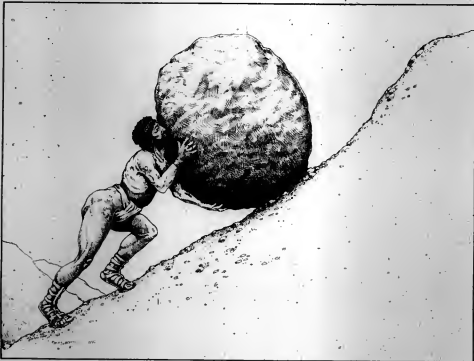
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Relational Data Base Management Systems



Pushing for Acceptance

By Paul Gillin

At Napco Industries, Inc. in Hopkins, Minn., the Information Services Department converted this year from IBM's DL/1 hierarchical data base management system (DBMS) to Applied Data Research, Inc.'s (ADR) Datacom/DB, a relational model.

Nate Gould, Napco's director of information services, was convinced that relational was the way to go because "We need to get at data in many different ways. With DL/1, we needed too many keys and indexes to get at data."

By the end of 1984, Napco's data base will fill seven IBM 3370 disk drives with an average of 15,000 to 20,000 transactions daily. And performance under Datacom/DB is at

least as good as it was under DL/1, Gould said.

But the DP department at Inland Steel Co. in East Chicago, Ind., gave relational DBMS only a cursory look when it went shopping for a data base last year. "We're planning to do big things with our data base, like automated data capture from the factory floor. You can have very lengthy runtimes with relational," Jay Schwarz, Inland's data base administrator, said.

The company eventually settled on the inverted list architecture Adabas DBMS from Software AG of North America, Inc. to run on its IBM 3081 and Amdahl Corp. 470V/8 processors. "The main thing we were looking for was productivity gains," Schwarz said. "Adabas has a lot of nice features built around it,

like the [Software AG] Natural language and security features. It was more functionally complete."

These contrasting examples highlight a debate that is heating up in the software industry as vendors and users show increasing interest in the improving technology of relational DBMS. While the relational architecture has been long admired for its ease-of-use features, vendors have begun to claim that the model is suitable for high-volume production applications, a claim that critics vigorously dispute.

Relational DBMS came into its own this year largely because of the endorsement of one vendor. In announcing Database 2 (DB2) and a version of its SQL for its MVS operating system last June, IBM told its largest users they could test the re-

RELATIONAL DATA BASE MANAGEMENT SYSTEMS

lational waters without giving up the sanctity of their existing IBM IMS data bases. However, the computer giant was careful not to position DB2 as a replacement for IMS, but rather to position it as an adjunct containing extracted tables for use by nonprogrammers.

The year also saw the second largest data base vendor, Cullinet Software, Inc., announce IDMS/R, a relational version of its popular IDMS. Cincom Systems, Inc. followed by announcing Ultra, a relational system for Digital Equipment Corp. VAX-11 superminicomputers. These vendors joined such other systems software heavy weights as ADR and Computer Associates International, Inc. as recent converts to the relational view.

'It Really Has Arrived'

DB2 and IDMS/R were the most significant announcements to address the subject, according to observers. "There is no question" that the whole direction of data base is in relational, according to Ronald G. Ross, editor of the "Data Base Newsletter." "When you've got both IBM and its major competitor at the large end saying that relational has arrived, then it really has arrived."

But viable relational DBMS in a transaction-heavy environment is still at least five years in the future, Ross asserted. However, the pressure for more technically elegant DBMS models will come from the users rather than from DP, which marks a new trend.

"Relational DBMS was in the

wraps of academia and was not well understood for years," said Bernard Plagman, president of The Plagman Group, Inc., a management consulting firm. "IBM has lifted that shroud in announcing DB2." Plagman predicted that "the primary use of relational DBMS for the early years will be as an information center product. Transaction-driven DBMS will remain traditional for years to come."

But some vendors are banking on the opposite trend. "We have been convinced that relational techniques will be much more viable in the '80s than others," said Mark

Wasilko, marketing manager for CA-Univers at Computer Associates. First installed in April, Universe was Computer Associates' entry into the DBMS market. Of the more than 60 installations anticipated by the end of 1983, most are using Universe as their primary DBMS, Wasilko said.

The debate over response times "is only a small part of the issue in my book," compared with the challenge to DP control presented by microcomputers, Wasilko said. "With personal computers, users now have a new alternative to DP," Wasilko said, adding, "We're giving

DP an alternative to loss of control in that they can now take advantage of their investment in the data center."

But that control may come at a price. "It's not a software problem; it's a hardware problem," said William Inmon, director of Coopers & Lybrand in Denver. "We're seeing some corporations using up mainframe after mainframe for relational processing."

Inmon said vendors are being wrong in touting relational DBMS as suitable for high-volume transactions. For example, relational

(Continued on Page 70)

What 'Relational DBMS' Means

While relational data base management systems (DBMS) became the talk of the data base industry in 1983, the definition of what the technology entails became cloudier.

Essentially, the relational DBMS provides a logical view of data using tables with rows and columns. Data structures are defined in logical rather than in physical terms. Relations are normalized — that is, there are no dependencies within a relation. Indexes and pointers are not needed to navigate the data base.

Only three functions are theoretically required to access specific data. The Select function retrieves rows based on a stated criterion. The Project function extracts columns, or attributes, from a relation. The Join function combines relations based on specific criteria.

Relational DBMS uses a very high-level language that should insulate the user from the need to know the underlying data structures.

As summed up by Ronald G.

Ross, editor of the "Data Base Newsletter," "In relational, the user is absolutely unaware that any physical construct may be necessary to support his query, which is in a purely logical structure."

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RELATIONAL DATA BASE MANAGEMENT SYSTEMS

(Continued from Page 69)
systems routinely scan entire data bases in response to a SELECT command, a procedure that is acceptable in batch processing, but can destroy response times when performed on-line. "As long as the relational environment has capabilities for entire data base scans, you are not going to be able to achieve the throughput for high-volume transactions."

Furthermore, Inmon questioned the desirability of letting end users access the corporate data base. "It's taken 15 years to get operational systems up to the point [where] they are today," he said. "I sure hope we don't get something that will let users run amok in the

data base."

Companies experiencing these kinds of problems usually take one of two unpleasant approaches, he said. They continue to throw hardware at performance problems or clamp down on data base usage. Either approach annoys the users.

A more palatable alternative that was tried successfully by a Coopers & Lybrand client was to offer users relational functions on micros with restricted access to the corporate data base, Inmon said. Although the initial user reaction was negative, the project later proved to ease demands on processing power while offering users the access they coveted.

Most observers agree that debate

over the viability of "truly relational" production data bases is becoming secondary to the emerging need for relational-like features. Unfortunately, Ross said, this has led to a war of words in which the user is the ultimate loser.

"I would rebel against any vendor who told me he had a functional relational front end if I found out the data base was unable to support relational operations fully," Ross said. "But if he could demonstrate that his DBMS engine fully supported those functions, I would readily accept him into the fold of relational vendors."

ADB's Databcom was redesigned

two years ago from an inverted list architecture into a structure the company calls "relational indexed." Like relational, data is stored in tables, but the DBMS also incorporates an index that is invisible to the user.

Databcom also makes extensive use of ADB's Data Dictionary facility to define data bases, control users' authorization and functions and manage high-level application development. According to Stephen Gerrard, director of marketing for data base products at ADB, the aim is to "move these products more and more into the relational camp, but only if they can be used in a high-production environment."

"Academics may not agree with our implementation as a pure relational DBMS, but our goal is to have a relational data base for production, not for academic definition," he said. Gerrard claimed that over 95% of Databcom's more than 400 users employ the DBMS in high-transaction production environments. "We have not had users complain that it's not adequate."

A notable and successful holdout from the relational tide has been Computer Corp. of America (CCA). Sales of the company's modified inverted file Model 204 DBMS are growing 100% annually, and the company has no immediate plans to enter the relational arena, according to James B. Rothnie Jr., executive vice-president.

Rothnie criticized the "cultish sort of following" that has developed around the relational concept. "I think tabular data structures are shortsighted and will not be the wave of the future," he said. "On the research side, we've seen a shift away from relational into the areas of semantic data models and functional data models, both of which are basically network architectures."

In fact, Rothnie said, basic tabular structures have a case-of-use problem that are not recognized by vendors. "If you need information that accesses more than one relation, you have to perform a join which, I think, is virtually impossible for a user to understand," he said. "Languages like SQL and Relational Technology, Inc.'s Q are good for programming, but not for users, and the reason is [exemplified in] joins."

The value of relational has been its use of high-level languages that limit user control under a relational structure, but that can provide big benefits when appended onto richer architectures, he said.

What is needed to bring relational into the production environment? Many observers agree that advances in I/O technology, which balance the need of the DBMS to scan large amounts of data, could make a difference. Associative memory, in which retrieval from the storage device is done on the basis of content rather than address, is a promising technology, Flaggman said. Data base machines also present an attractive — albeit expensive — alternative to the access burden.

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The Users' Report

By George Harrar

The premise and promise of the information center is simply stated: Users can solve many of their own problems when provided with proper tools and techniques.

Two years ago, the information center was an appealing concept without a track record. Today, there is a record — the experiences of the companies which installed information centers early on. Is DP's applications backlog really reduced? Can fourth-generation software bring ease of use and productivity to the end user? Is the spread of personal computers throughout the company under control?

The information center promised

much. Now the promises can be matched to reality by looking at the center not as an IBM concept, but rather as an up-and-running part of several large American companies.

Chemical Bank

Some came from an engineering background, others from credit and human relations. Not one member of Chemical's 12-member Office Technology Center staff had worked in a traditional DP position. "We tried before to have DP work with users," Assistant Vice-President Cecil Toulon Jr. said, "and it just didn't work. DP has to talk the language it does every day, and users talk their own language."

According to Toulon, "You don't have to justify buying a personal

computer" at the giant New York bank. "If you get a senior vice-president to sign the purchase order, you can have one. That's the main reason for developing the center — to keep personal computing under control."

Since February of last year, the Office Technology Center has operated as much more than a personal tool for users. It is no less than a front-line means to corporate automation. "If we get the people at the top involved in the technology, the next step is the people under them," Toulon said. "So far we have worked with five or six executive vice-presidents and a similar number of senior vice-presidents. Once we get personal computers into of-

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fices, then we can connect them to office systems to create a workstation."

The Office Technology Center Toulon directs labors to create a friendly image, making sure, for instance, that the logo on the center's seminar brochures won't "make users afraid." The "Office of Technology, Center News," bearing the logo, will go out to 6,000 officers and professionals in 1984. "You must sell the information center," Toulon said. "Users still aren't sure DP is their friend, that it is something they can use. For 90% of our users, this is their first real introduction to DP. So you must use [public relations] and marketing

tools to sell it."

Chemical Bank diverged from IBM's Information Center concept in designing the Office Technology Center to incorporate personal computing, office systems and time-sharing.

Corning Glass Works Corp.

An employee interest survey showed that 71% of the Corning professional staff wanted personal computing or time-sharing capability. In response, the Corning information center evolved from a mainframe service to one now complemented by personal computers. The justification: Eliminate outside time-sharing and reduce system backlog. The prime pur-

pose: allow users to access data.

In 1981, there were 200 users corporatewide, with 1,000 hour/mo connect time and 30,000 CPU second/mo on an IBM 3033. By mid-1983, the number of users had jumped to 1,200, the connect hours per month to 5,000 and the CPU seconds per month to 70,000. "The key to the information center taking off was [IBM's] ADPS," said Doug Leupen, manager of Information Services at Corning's Health and Science division in Medfield, Mass. "That spreadsheet broke down barriers because you can become productive very quickly with it."

The ADPS departmental reporting software package provided the

function aspect of a successful information center. Also key has been the support and education provided by a small central staff, which currently handles 600 to 700 phone inquiries a week.

In 1981, the information center was instructed to break even within one year, and it did so. But in 1982 came the ultimate test. "The corporation was going through a period of lower earnings," Leupen said, "and break-even company-wide was cut by 6%. Yes the information center actually doubled in use that year, with full chargeback. Key managers were using the information center to help them lower their costs."

Corning, a multinational manufacturer specializing in materials and basic technology, is standardized on IBM-compatible hardware. Any terminal can log on through IBM's Systems Network Architecture to the corporate IBM 3033 mainframe in Corning, N.Y. "The big effort now," Leupen said, "is to integrate the personal computer into the information center concept. We're moving toward the work center concept of one terminal on one desk to serve many uses, such as word processing and spreadsheet."

The information center has not lessened the application backlog waiting at the door of data processing. "What really happens is you don't hit the backlog," Leupen said. "If a user senses his requirement won't be addressed for a year or so, he won't make it. The information center addresses the hidden backlog that can't be measured because you never know if it is there."

The recently implemented Focus data base management system from Information Builders, Inc. is considered to have the potential to become the most productive of the fourth-generation software tools. "Via Focus," Leupen said, "users can look at information in the mainframe through a CRT or pull it down to a personal computer for analysis or for making a graph." Other software packages commonly used are ForeSight, a financial planning package from United Information Services, Inc.; SAS from SAS Institute, Inc.; PGF and Peca, both from IBM; and Minilab, an on-line statistical system from Penn State University.

Denny's, Inc.

"In name, we're two years old," said Evan Wride of Denny's information center. "But we used the name improperly. In June, we restructured [the information center] properly as IBM defined it. We're treating the information center as a Big Eight accounting firm, a group of consultants."

Wride, as director of Communication and Administrative Systems, took over responsibility in June for an information center that "wasn't doing a good job in addressing new technology." In addition, he oversees Communication and Network Planning, reporting on a level with the director of Systems Development, Computing Services and the Planning and Ac-

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counting Staff.

"Communications has been identified as the key, the glue that will tie the division together," Wride said. Fifteen regional offices comprise the restaurant division of this billion-dollar company. Currently these offices run by telephone, telex and typewriter. The information center, which was started as a de-

velopment group using Focus instead of Cobol, is taking on a project management function. Top priority is making recommendations toward automating the offices with word processing, financial planning software and on-line access to the host computer.

"We're currently looking to hire a project leader, someone with the

same skills as if he were on the systems development staff," Wride said. This person will join information center experts specializing in personal computers and Focus to make a formal project management team ready to automate the regional offices. "We will probably take two months for the requirements definition, then do a pilot," Wride said. "When it's working well, we'll do it for the whole corporation."

Using the information center as a project team means that the same staff which studied the end-user environment and surveyed end-user needs remains after the project is implemented to answer end users' questions and solve their problems. In contrast to many in-

formation centers, the Denny's version gets involved in projects typically taking up to three months to complete.

Dennison Manufacturing Co.

"I haven't had to justify the information center budget, amazingly enough," John Lucas said. "I'm prepared to do it. The return is so obvious that they haven't felt it necessary." Lucas manages the center at Dennison, a paper remanufacturer (maker of stickers and labels) now getting into high-tech products such as point-of-sale terminals and labeling equipment. "We explicitly don't have charge-back. If a user is accessing the

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IBM's Information Center: Where It All Began

In 1973, IBM Canada in Toronto dedicated several systems analysts to go into the user community to help users write reports rather than having them march through the regular systems function. By 1974, this operation was named an "information center," an idea ready to spread across Canada and south of the border.

"Our stated goal at the beginning," said Gwen Warlow, the information center manager, "was to provide education, consultation, minimal environment support and problem resolution. We were trying to assist our users to become self-sufficient, that's always been our goal. That user self-sufficiency goal has not changed, but some of the subsets under it have. We've grown and deepened our involvement with user planning, resource management and office systems. We work with users much more, help them with any of their personal computing needs."

Two thousand regular end users are served by the information staff of 25. The user community is expected to grow to 2,700 in 1984, with the user-to-staff ratio staying about 100:1.

"We're looking at a broader user population now," Warlow said. "Initially, we had people who had learned tools and coded for themselves. Later on, there were users who were prepared to work with tools and could make extracts and reports for themselves. Now many people are using menus and program function keys only. They want things programmed for them."

Warlow's background is in marketing and administration in information systems. Her staff includes some from marketing, some from information systems and others from customer service.

"I think the information center works best under information systems," she said. "I think of information systems as neutral, not in finance, administration, marketing or customer service."

Warlow believes the information center has improved the overall quality of projects submitted to systems development, because end users are more sophisticated. "Now that they know how to use the tools, they are more realistic about the system they want," she said.

"Before, they would put a request in and prepare to go through the enhancement cycle. Now they build what they want right into the original request. They count on us-

ing end-user tools. The information center has achieved that," Warlow maintained.

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(Continued from Page 73)

mainframe, he just pays for computer time. If he's on a micro, he just pays for consumable supplies."

Lucas came from Honeywell, Inc., bringing 12 years of experience in financial analysis, Basic programming and time-sharing. One information center specialist and one temporary staff person report to him; he reports to the manager of User Systems within Management Information Systems (MIS). The main walk-in center, which serves about 250 microcomputer users and 35 to 40 users who work with mainframe products, is located within the MIS building at company headquarters in Framingham, Mass.

The new year launches a new effort to reach end users through satellite centers. "We started this idea ourselves," Lucas said. "We were looking at ways to put micros in the end-user community in the most effective way. There was no good alternative for the person who wanted to use a micro four or five hours a day, short of coming over to us. The satellite centers are more for people who understand what they're doing, working on ongoing applications." The satellite locations enable the end user who has "graduated" from the main information center to work on his own, closer to his office.

In the information center, Lucas maintains one ground rule -- no programming. "It's strictly off-the-shelf software," he said. "We think we can support most people that way. If we had to program, we couldn't support as many people. [The center] would become dedicated to a special group of people."

In the micro area, I-2-3 by Lotus Development Corp. is "preeminent," according to Lucas: For mainframe applications, the only fourth-generation language used is Infodata Systems, Inc.'s Inquire, the data base ad hoc query package allowing remote, multiuser access.

The Charleston, W. Va., information center, begun in September 1980, is one of two DP centers serving this multinational chemical, metal and carbon maker.

"It originated to support CMS installation when [IBM's] CMS was brand new," Robert Hutton, senior staff analyst, said. "Now people are getting comfortable with CMS, and throughout the company people are getting fairly heavily into personal computer use. So now the information center is becoming a resource for people using personal computers, mostly the larger ones from IBM and Apple [Computer, Inc.]."

Part of the center's purpose was to lessen applications backlog. "It has helped in CMS-supported systems," Hutton said. Software provided by the information center is designed, as Hutton said, "to be used directly by the user if he is willing to invest a little time." The software includes Inquire, SAS, Sasgraph and [Iscro Graphics, Inc.] Telegraph.

Originally, the information center was aligned under the MIS position of applications manager. A year ago it shifted to the DP area, under supervision of the data center manager.

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Unix And the New Contenders



By Jeffrey Beeler

Among research and academic institutions, it long ago established itself as a standard and has seldom lacked for outspoken admirers willing at a moment's notice to recite its many virtues.

But in the commercial world, a host of well-documented shortcomings has kept it from realizing its full potential and has seriously slowed its acceptance by nontechnical end users.

Today, however, the picture is beginning to change. Nearly 15 years after its conception at Bell Laboratories, Inc., this long-time bit player in the international business systems drama is finally starting to emerge from obscurity and grab

some of the limelight its fans consider long overdue.

Already it shows signs of becoming the preferred operating system for 16-bit personal computers and has even made modest inroads into central computing departments, where it can occasionally be found running on IBM 370s and comparable CPUs. Whether its limited successes on the business mainframe stage will continue and ultimately propel it into technological stardom and end-user acclaim is still open to debate.

As the 1983 calendar turns its last leaf and AT&T enters its first year of true deregulation, the evolution of this potentially influential software product will bear closer watching than ever before. What fi-

nally happens with it will present corporate management information systems (MIS) managers with new challenges and opportunities that will inevitably affect their ability to:

- Hire qualified programmers.
- Acquire the latest and most advanced programming languages and development tools.
- Sidestep the pitfalls of sudden hardware obsolescence while safeguarding their investment in existing software.
- Span the vast gulf separating personal computers and central mainframes.
- Keep pace with user demand for new, improved applications.

The object of all the attention and
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UNIX AND THE NEW CONTENDERS

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industry speculation is, of course, AT&T's Unix, an operating system whose overall performance thus far has drawn decidedly mixed reviews, with raves in some quarters and boos in others.

Initially for Bell Only

First written in 1969 by Bell Labs scientists Ken Thompson and Dennis Ritchie, Unix was intended as a program development tool strictly for AT&T's own internal use. Then, in the early 1970s, the user audience substantially widened when Bell began making the product available to the outside world, particularly to universities and research facilities. Because its

developer was then constrained from competing in the computer industry, the program was distributed to outsiders exclusively through licensing arrangements rather than being sold directly.

Since then, Unix has found its way into the hands of more than 2,200 licensees, among them some 700 institutions of higher learning, including MIT and the University of California, according to AT&T

fact sheets. At the same time, the system has also continued to flourish within Bell itself, where it is currently installed on approximately 750 CPUs in 300 sites, per-

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IBM to Develop Its Own Unix Version

IBM will develop and support its own version of AT&T's Unix and make the operating system available across a broad range of processor models, from personal computers to host mainframes, according to industry analyst Robert Fertig. As modified by IBM, the control program will be a "superset" of its

AT&T counterpart and will "play" on the 4300 and 308X series as well as on CPUs that have yet to be announced, he predicted.

"IBM needs to support Unix because it doesn't want independent software firms to control its destiny," and because it has to interconnect otherwise incompatible hard-

ware, the president of Greenwich, Conn.-based Enterprise Information Systems, Inc. said in a recent interview.

Fertig's remarks about the industry giant's operating systems plans put him in accord with market researcher Eileen Skrabutenas, who described Unix as one of AT&T's most important weapons in its impending computer industry showdown with IBM.

Because of its portability, Unix provides AT&T with a ready means of integrating a large corporation's existing systems organization with the hodgepodge of competing personal computers now proliferating among its end users. Such a capability for integrating dissimilar systems is currently unavailable from IBM, according to Skrabutenas, a senior analyst at Los Altos, Calif.-based Yates Ventures, Inc.

Skrabutenas also predicted that Unix will form the technological foundation for AT&T's first commercially available line of computing hardware, the initial models of which are expected to make their debut next year. Included in the anticipated equipment family will be an existing intelligent terminal that AT&T will upgrade with a Motorola, Inc. 68000 microprocessor to form the company's first Unix-based personal computer.

A second member of the predicted Unix-driven processor line will be a high-level CPU comparable in computing power to the Digital Equipment Corp. VAX-11 superminicomputer series, Skrabutenas said.

Like Unix itself, both the personal computer and the supermini were originally developed for internal AT&T use and are now being adapted for release to the outside world as the company finally enters the era of deregulation.

The advent of the first AT&T-supplied computing line will significantly expand the business world's hardware options and propel AT&T into the front ranks of the computer industry. "In the past," Skrabutenas recalled, "the leading hardware vendors included IBM, DEC and Hewlett-Packard Co. In the future, that select group will be joined by AT&T, which is the only company with enough clout to challenge IBM in the Fortune 1,000 environment."

The sudden entry of such a dominant new player into the equipment vendor bell game could spell big trouble for the "bunch" companies — Burroughs Corp., Sperry Corp., NCR Corp., Control Data Corp. and Honeywell, Inc. — some of which can ill afford increased competition in their traditional market niches, Skrabutenas warned.

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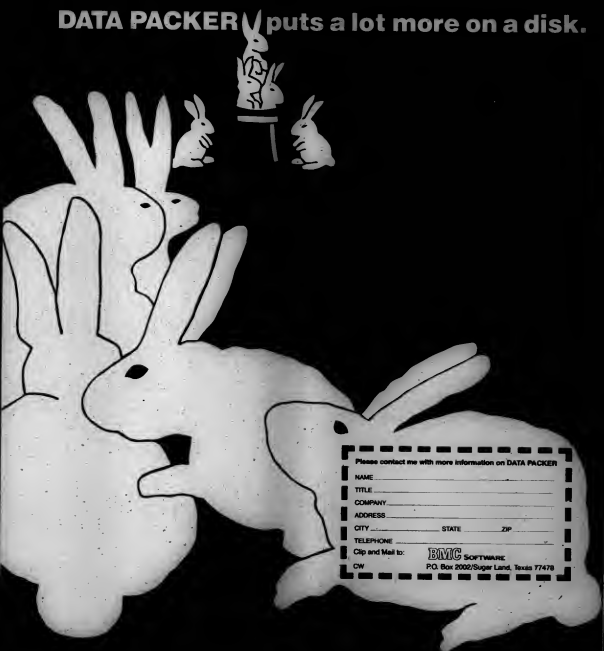
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forming hundreds of applications ranging from programming to office automation.

In the commercial world, however, efforts to spread the gospel of Unix have often met with stiff user resistance. The reason for the opposition has to do primarily with the operating system's obscure and complicated command structure—a feature well adapted to software development, but intimidating and difficult for computing novices.

To a large extent, therefore, Unix's long-term success in the commercial marketplace depends on AT&T's ability to simplify the program's user interface. Efforts to increase the software product's user-

friendliness will probably rank among the firm's top Unix-related priorities during the coming year, according to John Ulett, marketing manager for Microsoft, Inc.'s Xenix operating system.

Corporate Standard?

On the question of whether large companies will ever adopt Unix as a standard, opinions diverge widely. One of the skeptics in the debate over Unix standardization is Fenwick Holmes, president of the Santa Barbara, Calif.-based Information Academy, who retired earlier this year as information systems director for Del Monte Corp.

Holmes sees little chance for the vaunted AT&T operating system to

displace the well-entrenched IBM software that has dominated corporate computing centers for years. "The world of large mainframes is an institution like the Catholic Church, and it would take an awful lot of drive to get it to change," he contended. In theory, he added, MIS departments "should be their companies' main agents for internal change." In practice, however, "they are often less adaptable to change than they should be because of their vast investment in Cobol, procedural languages and operating systems."

Other sources see Unix standardization in the mainframe realm as a distinct possibility. The benefits of converting big corporate hosts to

Unix would be myriad, contends Jack Scanlon, vice-president of Western Electric's Processor and Software Systems Division.

According to Scanlon, because Unix is written almost entirely in C, it can be easily adapted to operate with many vendors' hardware. Thus, a Unix application originally written to run on Company A's processor can be quickly transported to Company B's.

For information systems directors, such portability greatly simplifies the problem of hardware selection by minimizing the potential ill effects of choosing incorrectly. With most other operating systems, "a data processing executive has to be as good a technologist as he is a manager," Scanlon said. "But if his company migrated to Unix, he

(Continued on Page 84)

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CP/M, MS-DOS To Help Shape Future of Unix

Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s Concurrent CP/M are only two of the widely used microcomputer operating systems with which the Unix world will increasingly have to contend. Other software offerings that are also likely to play a role in shaping the AT&T operating system's future will include the Unix derivatives and look-alikes.

The distinction between the two classes of Unix-like operating systems lies in their source code. Eileen Skrabutenas, a senior analyst at Yates Ventures, Inc., explained. Unlike the derivatives, which use the same source code as their AT&T model, the look-alikes are based on their own proprietary programming.

Among the derivatives, which include examples such as Microsoft's Xenix operating system, one of the key trends for 1984 will be the addition of windowing capabilities, according to John Ulett, Microsoft product marketing manager.

Among the look-alikes, meanwhile, Skrabutenas foresees the development of a standard port between Unix's latest version, System V, and the microprocessors of four major chip manufacturers—Intel Corp., Motorola, Inc., National Semiconductor Corp. and Zilog, Inc. When it released System V last January, AT&T's Western Electric announced the signing of an agreement to develop versions of the modified operating system for the four semiconductor makers' processors.

The convergence of a standard System V interface will allow application software to be transported easily among the four microprocessor options and will simplify the integration of personal computers into existing mainframe environments, Skrabutenas predicted.

As players in the larger Unix world, the look-alikes are likely to be confined primarily to narrowly defined market niches, she added.

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UNIX AND THE NEW CONTENDERS

(Continued on Page 80)
could be wrong occasionally in his hardware selection."

Portability also provides MIS heads with at least one other major payoff: Because software houses will increasingly gravitate to Unix, the operating system will make available to its users a wide selection of the latest and most productive applications, Scanlon said.

Pick to End Self-Exile With Future Release

One of the computing field's least known software products may soon end its long self-exile in the industry backwaters and make a place for itself in the mainstream of commercial applications.

For years, Pick & Associates, Inc., the originators

of the Pick operating system, have intentionally soft-pedaled their most cherished creation, whose many perceived shortcomings reportedly left the authors deeply dissatisfied and reluctant to seek widespread distribution. That combination of resolute

perfectionism and distaste for aggressive promotion has made Pick "one of the industry's best-kept secrets," according to Janice Antonellis, a senior market analyst for International Data Corp.

Soon, however, the fog of secrecy surrounding the op-

erating system may lift forever. An ongoing effort to rewrite Pick and, thus, rid it of its reputed drawbacks has finally begun to bear fruit in the form of a new Pick release, probably slated for introduction sometime next year, Antonellis said.

If reports of the imminent release prove true, the developers' long-delayed bid to push their products in earnest may finally be at hand, she added.

Pluses and Minuses

Whether the expected promotion succeeds and thrusts Pick into a position of unaccustomed prominence may ultimately depend on the scope and judiciousness of the rumored software rewrite. By all accounts, the control program's strengths are manifold.

Like its nearest equivalent, Unix, Pick operates with a wide array of processor models and size classes, ranging from personal computers to mainframes.

The system also boasts a large library of application software, according to Eileen Skrabutenas, a senior analyst at Yates Ventures, Inc.

Unlike Unix, however, Pick still lacks support for a high-level programming language, Skrabutenas said. In fact, the only language available with the operating system is Pick Basic.

Among small businesses, where Skrabutenas expects Pick's influence to be felt most heavily, failure to support a high-level programming language might work to a commercial operating system's advantage. But in the Fortune 1,000 world, such a handicap usually means instant rejection.

So as a future enhancement, high-level language support ranks among the leading candidates for inclusion in Pick's next release, Skrabutenas said.

Whether Pick ever finds a significant place for itself in the big-business sun also depends heavily on future directions with Unix. "If Unix finally acquires an effective user interface, Pick won't gain much momentum," a source who asked not to be identified said.

"But if Unix fails to become significantly more user friendly than it has been in the past, Pick may have a promising future," the source contended.

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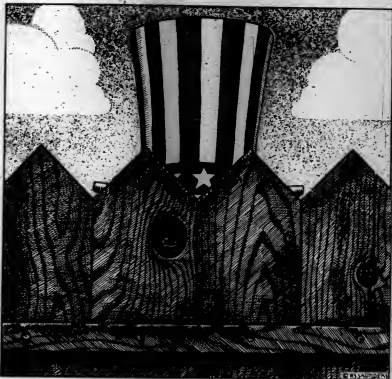
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Privacy Issues In 1984



By Jake Kirchner

There was of course no way of knowing whether you were being watched at any given moment... You had to live — did live, from habit that became instinct — in the assumption that every sound you made was overheard, and, except in darkness, every movement scrutinized.

— George Orwell's 1984

As the calendar turns to 1984, George Orwell's chilling negative utopia is much in the public consciousness. The terms "1984" and "Big Brother" are heard from every quarter, and many would have us believe that Orwell's society of complete government control and absolute lack of personal privacy is close at hand.

Actually, our society today is not at all similar to that depicted in the

novel. But then Orwell's story was not a prediction, but a warning — a warning that we and our institutions are evolving in such a way that our powers of self-determination are slowly being eroded. Unfortunately, what most people think of when they hear "1984" is illustrated in the quote above; they form a mental image of Big Brother as an oppressive physical presence in the form of jackbooted, truncheon-wielding fascists relying on Peeping Tom electronics.

The Big Brother we really face is a much different beast.

In the novel, the most obvious instrument of government repression was television; every room was monitored, every action observed and every sound heard. Television is many things in our lives, not all of them beneficial. But except for scrutiny from observation cameras in some stores, public buildings and

the like, most of us do not have to fear physical surveillance — at least not yet.

Computers, of course, were not well known in the late 1940s, when the novel was written. Today, many people think computers will be the primary instruments of repression. A recent Louis Harris opinion poll found that 77% of the general public and 79% of congressmen and their top aides are somewhat concerned to very concerned about threats to their privacy in the computer age. Another poll, conducted in Canada, revealed that more than half those surveyed fully expect their privacy will be invaded by computers or by government agencies and private sector organizations that use computers.

Certainly, computers make privacy invasion easy. Law enforcement agencies at every level are rapidly

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PRIVACY ISSUES IN 1984

(Continued from Page 85)
automating, in some cases for the purposes of surveillance. Bureaucratic and corporate organizations, not satisfied with the seeming data banks resident in their large main-frame systems, are deploying microcomputers by the tens of thousands with little or no thought to how all the personal data they process will be protected. And even the most minor financial transaction, it seems, requires one to fill out lengthy, detailed applications often demanding very personal and apparently irrelevant information—further grist for the computer mill.

But even with this trend to large-scale data gathering and lax security, the actual mechanism of com-

puterized privacy invasion is not well understood. Most people seem to believe it will result from too many organizations having too much information on you. While that is no doubt a legitimate concern, little thought is given to how that information will come to be in the "wrong" hands.

We fear that government and corporate America will come to take privacy for granted. In fact, our privacy is already gone to a great degree and, in fact, it was not taken; to a large extent, we gave it away, all too willing accomplices of Big Brother.

We traded our privacy for government benefits, ranging from food stamps and unemployment

checks to public education and income tax deductions. We bartered it for medical insurance, house mortgages, car loans, credit cards and check-cashing privileges. In many cases, we did not like giving up all the personal information, but we did not seem to have much choice.

Reflecting on this recently, one privacy advocate said: "It's always a trade-off; it's always a balance... The question is: Do you want to fill out this incredibly obnoxious application or do you want a credit card? Do you want to fill out this disgusting application or do you want a job... If you don't have a job, getting one is the most important thing."

Our concern now is that all that data might be used against us, that it will be shared by the wrong people in ways we are not aware of and would not approve of if we did know. We do not like it, but we do not know what to do about it.

Citizen Concern

Citizens are concerned about privacy, but do not know how to safeguard it. Computerized bureaucracies and corporations pay lip service to the need to protect personal privacy, but in practice are more concerned about efficiency than privacy. Legislators, whom we might expect to be concerned about our privacy, are just like the rest of us—deficits, crime, nuclear proliferation and unemployment seem to be much more immediate threats.

Computerworld recently asked a number of people interested in the privacy issue to comment on "the 1984 issue" and to speculate on the causes of and possible cures for the trend toward gradual privacy erosion.

If their remarks have any common thread, it is that the American public is very much concerned about privacy, but does not know how to protect it, and that is not likely to change unless citizens and legislators make a concerted effort to win back and preserve privacy rights.

A staff member of the U.S. House of Representatives' Subcommittee on Government Information, Justice and Agriculture, which has unsuccessfully pushed privacy legislation for years, said support for privacy measures is "a mile wide and an inch deep. People are willing to trade their privacy for every other benefit."

Why that is so is not immediately clear. Terrill J. Steichen, director of former President Carter's Privacy Project and currently a private consultant and writer specializing in information technology topics, put it this way: "The public hates Big Brother. They like privacy but, unfortunately, they have very distorted perceptions of both."

Privacy loss, according to Steichen, results from the incremental gathering of data by many organizations plus a concomitant loss of individual control over use of that data.

Data gathering and sharing, he said, produce "data images" of citizens. Organizations make decisions about people based solely on those images, even though the data may be old, incomplete, inaccurate and biased. The person behind the data is no longer a factor.

To August Bequai, attorney and author of six books on white-collar crime and related subjects, privacy invasion is considered a sign of the times.

"Technology in and of itself doesn't mean anything," he declared. He pointed, rather, to what he sees as "a lack of sensitivity on the part of people as regards privacy... We've become less sensitive to the other person's rights—that's what privacy is, another person's rights."

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PRIVACY ISSUES IN 1984

Federal Record Poor for Privacy Protection

With so much concern today over privacy issues, the logical question to ask is why the government is not looking out for our privacy.

Why must we fear intrusion by government agencies? After all, 1984 also marks the 10-year point for the Privacy Act, passed to ensure individual privacy protection in government operations. But today, there is more government data gathering, more data sharing and less individual control over what agencies do with our data than ever.

According to a recent congressional report, the current administration has the worst record for privacy invasion of any since the Nixon years. The report accuses the Office of Management and Budget (OMB) — responsible for overseeing agencies' privacy practices — of almost complete failure to perform its duties under the Privacy Act.

Here again, lack of understanding plays a role. Government agencies, with some exceptions, do not seem to understand why they should be as zealous about protecting personal privacy. They also often confuse privacy with security and think that keeping data secure is the same thing as protecting the privacy of the data subjects.

Reluctant Citizens

OMB Deputy Director Joseph R. Wright told a congressional subcommittee a few months ago that a public perception that government data banks can be tapped from outside might make citizens reluctant to supply data to the government, "thereby eroding the integrity of our data bases and ultimately affecting the quality of our programs."

What Wright did not say is that the same thing holds true for privacy protection. If citizens feel the government is not respecting the confidentiality of personal information, if the data is freely shared by other government and private entities, agencies may encounter resistance to their data-gathering efforts. But to the government, the threat is always from the outside, never from within the organization.

Commenting on that, Terril J. Steichen, director of former President Carter's privacy project and currently a private consultant and writer specializing

in information technology topics, remarked, "The fox is not going to view himself as a mad slayer of chickens. He sees himself as playing a vital role in the world. No one, including the government bureaucrat, likes to have his integrity questioned. . . . [To him] all the bad people are outside."

Beyond that, as the House Government Operations Committee report put it, "Privacy interests frequently conflict with other important governmental interests, such as economy and efficiency." According to Steichen, "Government often presents privacy as a luxury that costs government money; [privacy is] sort of silly because it requires duplication of data gathering."

It seems clear that any push to reeducate the government to privacy protection will have to come from outside the bureaucracy itself and will have to be mandated by Congress. But the chances for congressional action on privacy matters are quite slim.

The only privacy legislation now before Congress is a bill by Rep. Glenn English (D-Okla.), chairman of the House Government Information, Justice and Agriculture Committee, which calls for a separate government entity to oversee privacy protection. The bill, however, is controversial even within the subcommittee, primarily because it would establish a new agency in a time when the trend is toward less bureaucracy, and according to Capitol Hill sources, the bill will be moved slowly, if at all.

The legislation "needs a tremendous amount of additional support," a subcommittee said. And given the Republican-controlled Senate, particularly the Judiciary Committee headed by Strom Thurmond (R-S.C.), there is almost no possibility of getting Senate approval of any but the most minor privacy legislation during 1984.

In the Senate, the most that can be hoped for is tighter privacy regulations for agencies and a mandate for greater OMB vigilance in implementing the Privacy Act. The Senate Governmental Affairs Subcommittee on Oversight of Government Management will also continue its investigation into agency use of computer matching, particu-

larly as it relates to Internal Revenue Service data, but a subcommittee attorney said it is not clear what if any legislation might result from this initiative.

In addition, congressional privacy advocates on both sides of Capitol Hill are fully aware that the law enforcement community, especially the Federal Bureau of Investigation, has been able to gut or kill any privacy legislation for the last five years.

Any privacy protection mechanism makes law enforcement agencies fear they will lose access to data they feel they need to do their jobs, and to a certain extent they are correct. Congress to this point has not been able or willing to make it clear that, at least in terms of privacy, police in a free society must operate under some restraints. The blame for this state of affairs, however, should not rest solely with any one ideology; liberal legislators, too, have been negligent about privacy protection. Not only have they not faced down law enforcement, they have also been quick to advocate increased data gathering and computer matching in social welfare programs.

Evidently, a time of tight federal budgets, programs to help the needy must be run in a climate of fear, and recipients, who in many cases are the most defenseless, must give up their privacy rights and be treated as second-class citizens in order to qualify for benefits. This holds true not for those who, because they are at the bottom of the economic scale, must wait at the end of the government giveaway line.

Few of the more fortunate among us recognize that we receive far more in government benefits — from mortgage interest deductions, corporate tax credits and the like — than does any fatherless family on food stamps. If we do not protect the privacy rights of the least among us, who will protect ours?

The question is not academic, according to August Bequal, attorney and author of six books on white-collar crime and related subjects, who has done considerable thinking about the future of privacy and data security in the U.S. He argues that automation combined with a growing lack of ethics in this coun-

try threatens more than our privacy.

"If you have the right formula, and by that I mean the instruments of technology to gain all sorts of information and the instruments to control information and a lack of ethics, and . . . if the socio-political-economic fabric of America suffers a traumatic event or events — recession, invasion, terrorist attack — the unethical, armed with this awesome technology, can deprive us of our privacy and our political freedoms."

"We've been spared this in our country, thank God. In our country, Bequal said, "I find it hard to believe the naïveté of people who are supposedly intelligent. . . . They say, 'So what?'"

Not Without Hope

Despite the gloomy assessment of many privacy advocates, 1984 is not a year without hope. Indeed, all those contacted by *Computerworld* were uniformly optimistic that the privacy situation can change. Bequal, seemingly the most pessimistic of all, contending that education at all levels can make us more sensitive to the need to protect our privacy and that of all citizens.

The year 1984 has spawned considerable interest in privacy. George Orwell's book and the current state of society will be the topics of seminars,

hearings and meetings all across the country during the coming year. Those concerned about privacy are hoping these will lead to much more grass-roots support for privacy regulations and codes of conduct in government and the private sector.

John Shattuck, head of the Washington, D.C., office of the American Civil Liberties Union, which is working with a number of public interest and professional groups to elevate the privacy issue in the public and in state and federal legislatures, said the combination of increased public access to computer technology and the Orwellian year are creating a better climate for action on privacy matters.

Shattuck said any privacy legislative agenda probably will have to wait for a change in the control of the Senate and for a new president. But he also said he does not see any presidential candidate making privacy a campaign issue. This he attributed to "overarching issues," such as the economy and foreign policy, that are crowding out privacy matters.

But, he said, "If it weren't for the fact that the world is otherwise falling apart, [privacy] might be the top item of priority." In any event, Shattuck said, privacy is an issue whose time has come.

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Computer Matching



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An Ethical Exchange?

By John Gallant

I think there are some very distinct signs that Big Brother is around and watching. I don't mean that strictly in an Orwellian sense, but in the insidious ways computer matching has made possible. This widening exchange of information is the basis for a general surveillance system.

— John Shattuck, director of the Washington, D.C., office of the American Civil Liberties Union

Norma Rollins believes that important events — milestones, if you will — crystallize support for privacy issues.

Rollins, director of the New York Civil Liberties Union (NYCLU) Privacy Project, hopes that 1984 — in

John Gallant is a Computerworld staff writer.

an Orwellian sense — will be the milestone that coalesces opposition to the widening use of computer matching.

"The last driving force behind a privacy issue was Watergate. The 1974 federal Privacy Act came about as a result of that," Rollins said. "Maybe 1984 will be the same for computer matching. That's a magic year. [George] Orwell's book may be just the thing to stimulate our thinking and to build a constituency once again."

Empowered by the U.S. Congress to regulate the use of computer matching on the federal level, the Office of Management and Budget (OMB) defines "computer matching" as a procedure "in which a computer is used to compare two or more automated systems of records or a system of records with a set of

nonfederal records to find individuals who are common to more than one system or set." The definition is simple enough. But the benefits of computer matching, the future of efforts to limit its use and its impact on personal privacy in the heralded year of Big Brother are issues that are far from clear.

One thing, at least, is certain. The technique of computer matching will be used more often, and for a wider range of purposes, on both the state and federal levels. President Reagan has placed high priority on the eradication of fraud and inefficiency in federal benefit programs, instructing administrators to be "as mean as junkyard dogs" in their efforts to combat theft and waste. Under the Reagan administration's auspices, the technology

(Continued on Page 90)

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COMPUTER MATCHING

(Continued from Page 88)
behind computer matching is constantly being refined.

"The most common problems in government programs are overpayment of benefits and erroneous payments to recipients whose assets exceed the income standards. Computer matching is simply the most efficient method to pinpoint data on assets and income and ensures that only the deserving get government benefits," said Thomas McBride, former inspector general of the U.S. Department of Labor and Agriculture.

McBride, currently associate dean of the Stanford University Law School, also supervised the Computer Matching Project of the

President's Council on Integrity and Efficiency. His former colleague on the project, U.S. Department of Health and Human Services (HHS) Inspector General Richard Kusserow, is even more adamant in his support of computer matching. Charged with protecting the department's \$300 billion annual budget, Kusserow estimated that he and his staff initiate three-quarters of the matching programs undertaken by the 18 federal inspector generals.

"I hate the term 'computer matching,'" Kusserow said. "It's like a fingernail on a blackboard to my ears. This is nothing more than an automated auditing technique. It's a labor-saving technique, and if I wasn't using it, I should be fired. We're protecting the disadvantaged, the aged and the retarded. I want to be certain that only they get the benefits they're entitled to. I can't imagine anyone objecting to that. In this case, we're on the side of the angels."

Heavenly support notwithstanding, opponents of computer matching see in its widening use an increasing, dangerous impact on personal privacy. According to Ronald Plesser, former general counsel to the federal Privacy Protection Study Committee, the use of computer matching is leading to a "dangerous disintegration" of Fourth Amendment privacy rights.

"The government is pretty well committed to the use of computer matching," Plesser explained.

"There have been attempts to get as much information as possible from [Internal Revenue Service] files, and they're even thinking of using census data. I would be shocked if they did that. We can expect a greater use of private information by the government also. That's troubling."


Robert Ellis Smith, publisher of the Washington, D.C.-based "Privacy Journal" newsletter, said the future promises a greater mass use of personal information, but no proportional rewards in terms of efficiency. "These programs won't do all the things they're supposed to do. Don't expect any great benefits from these techniques," he said.

Smith likened the use of computer matching to "a mass invasion of privacy," a problem that in the future will be aggravated by government's increasing reliance on private records. "The government is discovering that it doesn't even have to collect the data anymore. There are no laws limiting it from using private information," Smith said. "That means we'll have to rely on private organizations to protect our privacy rights, and if the price is right, they'll give up any information."

John Shattuck, director of the Washington, D.C., office of the American Civil Liberties Union, called computer matching "the fastest growing privacy invasion industry in government." He also criticized what he labeled the OMB's failure to regulate properly its use and a lack of congressional

(Continued on Page 85)

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- ① **Software Contracts & Licenses**
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- ② **C Style and Portability**
Speaker: Eric Allman, of Britten-Lee; Lori Gatos, CA
- ③ **UNIX Systems Administration**
Speakers: Ed Gould and Bob Kridle, of Mt. Kink, Berkeley, CA
- ④ **Advanced Shell Programming**
Speaker: Steve Bourne, of Silicon Graphics, Inc.; Mountain View, CA
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Speaker: Jack M. Scanlon, Western Electric Company
- ⑧ **Joint Session - 10:30 a.m. - Noon**

- ⑨ **UNIX in Government - 1:30 - 3 p.m.**
- ⑩ **Market Research and UNIX - 3:30 - 5 p.m.**

THURSDAY, JAN. 19

- ⑪ **Microcomputer to Mainframe Communications - 8:30 - 10 a.m.**
- ⑫ **Graphics Applications on Work Stations - 10:30 - Noon**
- ⑬ **UNIX to Microports - 1:30 - 3 p.m.**
- ⑭ **New Developments in Office Automation - 3:30 - 5 p.m.**

FRIDAY, JAN. 20

- ⑮ **Case Studies in Office Automation - 8:30 - 10 a.m.**
- ⑯ **UNIX Standards - 10:30 - Noon**

- ⑰ **Graphics: Computer Graphics Systems & Applications - 1:30 - 3 p.m.**
- ⑱ **Joint Session - 3:30 - 5 p.m.**

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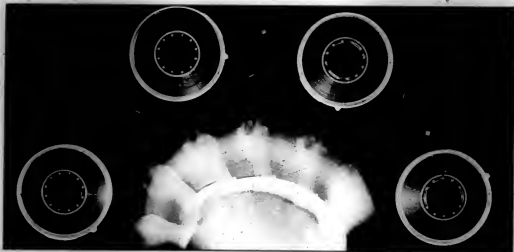
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COMPUTER MATCHING

(Continued from Page 90)

interest and oversight — concerns shared even by some advocates of computer matching.

"It's almost a runaway train," Shattuck said. "There are virtually no restrictions on its use. The OMB has not disapproved a single use of computer matching. It's my feeling that they haven't even reviewed most of them because there is so little organized opposition to it. Until the OMB begins to exercise regulatory authority over this, there is a tacit invitation for agencies to define as legitimate all uses of computer matching."

Because the technology behind computer matching has "mushroomed," according to NYCLU's Rollins, utilization of the techniques has outstripped government policies and individual protections. Without the creation of some sort of national computer matching oversight agency, individual privacy may face extinction, Rollins said.

"A few years ago, people were up in arms about a proposed central federal data bank. But we don't need it anymore. The central data bank may not exist physically, but the way computers can now share information, it's already in place. It's time we step back and make some rational decisions. If computer matching continues on this course, it may be too late in a couple of years," Rollins said.

Those privacy concerns have even prompted some advocates to admit that legislative action is overdue. According to former Inspector General McBride, the issue of computer matching will become a major legislative topic in the next few years. "I think government officials and taxpayers have strong concerns in making efficient use of benefit programs. But there is a need to balance that with privacy concerns. I'm confident that the large majority of congressmen represent a constituency that is concerned with both."

Whether that privacy constituency will arise is far from certain. "I don't see any evidence of legislative concern," Smith said. "It's very hard for people in political life to oppose computer matching, because it's touted as cutting fraud and waste."

Plesser added, "I wish it was true. But it won't happen. I'm not convinced that anyone — with very few exceptions — is interested in computer matching in either the Senate or the House."

According to HHS' Kussow, the future does hold promise for legislative action, but in a far different sense. "There has been a lot of improvement in the way we use computer matching. We're trying to move these techniques to the front end, to pick up exceptions before they go into the data bank. We've made the process far less intrusive, or Congress would already have taken action against it. What you will see, though, is a legislative mandate to do more computer matching, to undertake some of these state-initiated programs on the federal level."

In Kussow's view, the future of computer matching rests on efficiency rather than privacy. During his term there, the Computer Matching Project targeted its newsletter toward program administrators, offering tips on the use of computer-matching techniques, case histories and cost/benefit analyses of the programs. Kussow emphasized that each computer-matching project must be "tested and refined in order to reduce the number of people who are intruded upon."

"No one questions my authority to audit the records of my agency," Kussow added. "I'm mandated by Congress to do that. Because con-

(Continued on Page 94)

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COMPUTER MATCHING: AN ETHICAL EXCHANGE?

Of Agencies Employing Computer Matching

world, a spokeswoman for Selective Service said the agency has discontinued the use of Social Security data and now relies mainly on driver's license records obtained through individual contracts with state motor vehicle divisions.

One of the most controversial of the computer matching projects to date is Massachusetts' Bank Match Project. The commonwealth's Department of Public Welfare submits computer tapes bearing the Social Security numbers of

all welfare recipients to more than 100 banks in an effort to snare recipients who have more money in their bank accounts than allowed by law. As of September, almost 1,200 of the 1,839 recipients whose benefits were initially ter-

minated remained off the welfare rolls. The agency estimates that Bank Match has saved Massachusetts \$5 million to date.

Selective Service said it is only waiting input from the U.S. Department of Health and Human Ser-

vices before it implements a program to compare periodically its computerized draft registration records against lists of absent fathers with child-support obligations. [CW, Oct. 24, 1983] The Selective Service maintains information on some 11 million men between the ages of 18 and 23 who have filed with the agency since draft registration was reinstated in 1960.

New York's Wage Reporting System is a quarterly computer match of public assistance and unemployment records against information on the reported earnings of the state's 8 million workers. State Department of Taxation and Finance wage data is compared with lists of public assistance recipients and unemployment insurance claimants submitted by the Social Services and Labor Departments. Matches are returned to those departments to be investigated.

In the Wage Reporting System's February 1982 annual report, the Commissioners of Social Services, Labor and Taxation claimed that the program had saved \$23.7 million in public assistance payments and \$14.5 million in unemployment insurance. Those figures were disputed by the New York Civil Liberties Union, which claimed that many of the costs of the program had not been taken into account.

Implemented last year, the IRS' Offset Program is aimed at withholding tax returns to individuals delinquent in child-support payments. Using a consolidated list of those persons provided by the Department of Health and Human Services, the IRS runs a computer match against its master files and offsets individual tax returns by the amount of child support owed. In 1982, the IRS withheld \$174 million as a result of 279,000 such offsets.

In December 1982, the federal government announced it would begin garnishing the wages and pensions of almost 47,000 government and military employees and retirees unless they agreed to repay close to \$68 million in delinquent student loans. The wage garnishment program was the result of a computer match of nearly 10 million government employee records against a list of student loan defaulters.

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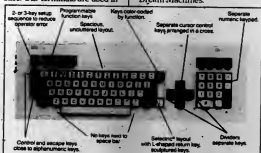
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ELECTION '84



Butting Heads Over Industrial Policy

By Jake Kirchner

Election year 1984 opens with campaigns for the White House and for congressional seats already in full swing. In every national election, the economy in general — and jobs in particular — is a major point of contention between the Democrats and Republicans.

This year will be no different, even with the recovery advancing on almost every front. This is primarily a legacy of the painful recession that has accompanied much of the Reagan presidency.

In 1984's campaigns, the Democrats will claim that Reagan policies have been disastrous for the working man and point to the persistent high levels of unemployment over the last several years, levels that

not even the recovery has brought down any significant degree. The Republicans, on the other hand, will point with much pride and self-congratulation to the economic turnaround that began in mid-1983. They will advance the argument that all is well again with the economy, that the recession was an unfortunate, but perhaps necessary, dose of medicine to get the country on a long-term healthy track and that as the economy continues to improve, more industries will rebound and hire more people.

While the candidates mount the stump to point the economic finger of blame at their opposition, they will be mindful that the electorate may well be moved to ask what can be done to ensure that the economy will continue to grow and unem-

ployment continue to decline. The parties' strategies for future economic vitality will be articulated under the heading "industrial policy."

Industrial policy — the general term given to various approaches to what the government should or should not do to promote new industries and protect the old, thus ensuring sufficient employment levels for future generations — will provide the hails that fix the economic plank to the parties' platforms when they are constructed at the national conventions later this year.

With that in mind, the two parties are already developing their respective industrial policies. While industrial policy has been one of the hottest topics in recent national

Jake Kirchner is a Computerworld correspondent based in Washington, D.C.

INDUSTRIAL POLICY

debate among economists, most of the practical application of various opposing theories has centered in Congress, where the Republican and Democratic variations have already begun to emerge.

General Policy Outline

Although not all politicians have lined up behind one industrial policy approach or another, the general outline of the two parties' thinking can be summarized as follows:

Democrats believe the future economic health of the nation requires a collaboration of government, industry, labor and academia to determine the best method of future development.

Republicans believe the government should reconsider all laws, regulations and policies that have any bearing on the economy and re-define them to create an economic environment that allows industries to grow as much as possible in a generally unfettered free-market economy.

The Democrats describe their approach as a sensible, democratic means of joining all sectors of the economy to chart the most widely beneficial course for the economy. Republicans disdain that idea, scornfully referring to it as a doomed attempt to "pick winners and losers" from among today's industries through government inter-

ference, which they claim will be fraught with bureaucratic bungling and pork-barrel politics.

In the words of Treasury Secretary and Republican spokesman Donald T. Regan, the Democrats' approach is "a cure in search of a disease, a nostrum being pushed without evidence as to its efficacy for various misdiagnosed or imagined illnesses." Less diplomatically, Republican Congressman Thomas E. Petrie of Wisconsin, who said the Democrats' ideas are "perilously close to the corporate state of [Benito] Mussolini, the original model of fascism."

This is not to say there are not substantial areas of agreement between the two parties about certain "necessary" components of eco-

Both say high-technology industries — particularly computers, semiconductors, telecommunications and robotics — will be central to the U.S. economy.

Both parties say government policies, tax codes, capital investment regulations and antitrust laws must be structured to promote research and development and investment in plants and equipment. Both seek ways to increase productivity. Both would promote better math and science education and better, more wide-ranging employee job training programs to provide the workers that will be needed in future, high-tech America.

Republicans and Democrats say older industries must be encouraged and helped to modernize, that international trade must be advanced and U.S. industries must be protected from unfair foreign competition.

How, Not What

It is the question of how, not what, that divides the two parties and sets the stage for the election-year economic debate.

An outline of Democratic thinking was developed in November by the House Economic Stabilization Subcommittee of the Committee on Banking, Finance and Urban Affairs. Under the direction of subcommittee Chairman Rep. John J. LaFalce (D-N.Y.), the panel held 30 days of hearings, receiving testimony from more than 125 witnesses. The subcommittee's Democrats then produced a report, "Forging an Industrial Competitiveness Strategy" that will be the basis for industrial policy legislation in the House.

Defining what he called "key structural problems with the economy," LaFalce introduced an industrial policy legislation package, which prominently featured a provision for a Council on Industrial Competitiveness to "coordinate our existing set of industrial policies into a more effective competitive strategy." The council would be set

up in the executive branch of the government and consist of high-level government officials and representatives of industry, labor, academia and public-interest groups. It would identify economic trends and problems and recommend economic strategies to the president and Congress.

The legislation also would mandate an Advanced Technology Foundation to promote applied research in the private sector. The most controversial provision in the package is a plan for a Bank for Industrial Competitiveness to channel needed capital into key U.S. industries. This would include monies for the so-called sunrise industries — the high-technology sector — and for older industries that must be revitalized to fend off competition from foreign firms with more modern plants and cheaper labor.

An ad hoc task force of Senate Democrats headed by Sen. Edward Kennedy (D-Mass.) shortly thereafter issued its own "Democratic Agenda" for providing future jobs, which embraced many of the same concepts, although the plan said the development bank at this point is only something that should be considered. The Senate Democrats also emphasized programs for promoting trade, worker training, education and R&D.

(Continued on Page 98)

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INDUSTRIAL POLICY

(Continued from Page 97)

The Republicans are not so well advanced in their industrial policy planning, but much work has been done. For example, a White House Commission on Industrial Competitiveness, headed by Hewlett-Packard Co. President John A. Young, has been looking into R&D, productivity, education, training and foreign threats to U.S. industries.

More recently, House Republicans have formed a 234-member Task Force on High-Technology Initiatives, chaired by Rep. Ed Zschau, a former computer company president and first-term representative from California's Silicon Valley area. The group has already articulated a Republican approach to industrial policy, which the task force says will be backed by a legis-

lative agenda for actions "compatible with a consistent and predictable policy of the role of government in relationship to the private sector."

This agenda "will focus on creating an environment in which high tech, new ideas and industrial growth are likely to flourish," the task force said, adding that this "climate for innovation" would include:

- A commitment to basic research.
- Incentives for risk taking by investors and entrepreneurs and an abundant supply of risk capital and

a favorable regulatory climate.

- A strong educational capability, particularly in the sciences, providing a well-educated and technically trained work force.
- Expanding foreign and domestic market opportunities.

Battle Lines Drawn

So the lines of battle are drawn. The Republicans will emphasize the economic turnaround and tout their plans to cement an economic climate that will enhance industrial competitiveness and ensure long-term economic health. A healthy economy, they will argue, will

guarantee jobs and prosperity for all Americans.

The Democrats will constantly remind working Americans of the economic ills of the early 1980s. They will portray whatever final strategy they adopt as a concerted effort to ensure a more flexible and equitable economic order that will fend off any future job-killing recessions. They will promise to protect and modernize mainstream manufacturing sectors while providing the climate for explosive, industrywide high-technology growth.

The current unknown in the coming debate on the two parties' plans is, ironically, the economy.

If the recovery of 1983 turns into the boom of 1984 with drastically lowered unemployment, the industrial policy debate may well fall to the Republicans, who will claim the country should not change a successful program.

If the recovery stagnates and unemployment remains high, the Democrats will have a potent argument for their industrial policy agenda, an agenda they will portray as a major change of direction from failed Reaganomics.

Democrats' Platform

According to Senate and House Democrats, federal actions under their industrial policy plans would include:

- An executive branch council of government, labor, business and public interest group representatives to develop a coordinated industrial policy program and encourage business, labor and government cooperation.

• Federal- and state-level centers to promote university and private-sector research and development.

- Clarified antitrust laws to encourage joint research and development in the private sector.

• Permanent tax credits for R&D.

- Improved investment in plants and equipment through federal support of state development finance agencies and consideration of a national development bank for direct federal financial support for industry.

• Education programs to include upgraded science, math and foreign language studies at all levels and vocational education programs targeted at disadvantaged youth, displaced homemakers and dislocated workers.

- Promotion of free international trade and government relief for industries that have been hurt by

imports.

- Adjustment programs for workers and communities facing changing markets and technologies, including restructured unemployment insurance, improved training systems to help small firms and dislocated workers, community service employment for dislocated workers and adjustment assistance for companies and communities.

Republicans' Policy

As outlined by the Republican Task Force on High-Technology Initiatives, a possible Republican industrial policy might include the following:

- Increased federal funding of research carried out in universities and laboratories.

• A federal research and development project for advanced computer design.

- Federal promotion of research and development collaboration by U.S. companies, particularly through amended antitrust laws.

• Permanent tax credits for R&D.

- Tax incentives for risk capital investment.

• Tax credits and deductions for corporate contributions of cash and equipment to schools.

- An aggressive federal trade policy aimed at achieving fair and free trade.

• A government fiscal policy aimed at reducing the deficit, strengthening general economic health and encouraging personal savings and investment.

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Election '84

The Automated Platform

By Katherine Hafner

When Tom Hayden was running for the California State Assembly in 1982, he attended countless cocktail parties where his aides made certain to collect the names and addresses of all those in attendance.

Shortly after the get-together, people who had been there received a personalized letter from Hayden, "just to stay in touch" and remind them of his stand on various issues.

Hayden won the election by a 10-point margin. His Republican opponent in the race to represent the district of West Los Angeles (population 300,000) has since dropped out of sight, and Hayden's incumbency greatly increases his

Katherine Hafner is a Computerworld staff writer.

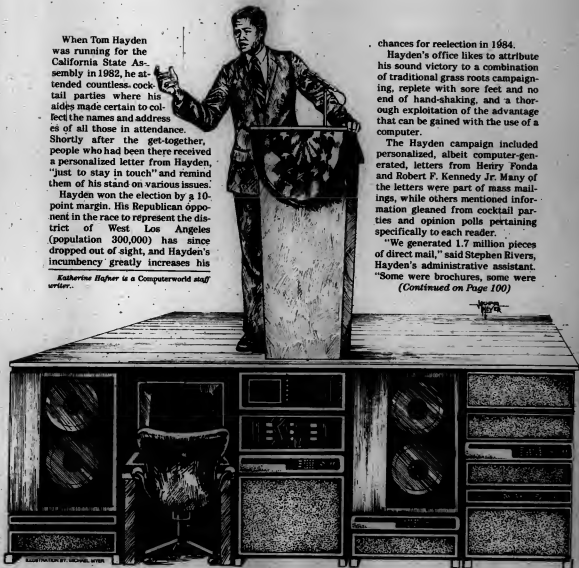
chances for reelection in 1984.

Hayden's office likes to attribute his sound victory to a combination of traditional grass roots campaigning, replete with sore feet and no end of hand-shaking, and a thorough exploitation of the advantage that can be gained with the use of a computer.

The Hayden campaign included personalized, albeit computer-generated, letters from Henry Fonda and Robert F. Kennedy Jr. Many of the letters were part of mass mailings, while others mentioned information gleaned from cocktail parties and opinion polls pertaining specifically to each reader.

"We generated 1.7 million pieces of direct mail," said Stephen Rivers, Hayden's administrative assistant. "Some were brochures, some were

(Continued on Page 100)



THE AUTOMATED PLATFORM

(Continued from Page 99)

personalized letters. You determine whom you want to write to and the message you want to convey, and they are individually typed.

"Tom walked precincts every day, he met hundreds of voters and put information about their concerns into the computer for follow-up letters and phone calls," Rivers said. "Everyone he met would get input to our in-house computer and would get a personal letter."

Hayden's mode of operation is being duplicated by political candidates across the country, who are gearing up for the 1984 elections with the use of computer systems large and small, in-house or via outside direct-mail services.

Computers are being used to unprecedented precision in the identification and typesetting of voters. Census and other demographic data is used to figure out geographic areas for a candidate to concentrate on, and computers are used to gather and retain voluminous data about individual voters. Like Hayden's campaign in California, a candidate will start with a list of voters in a district, add as much information as possible about each person and then reach that person by using that information.

Heated Battle

Perhaps most heated of all is the battle between the Republican and Democratic National Committees,

whose respective data processing systems generate thousands of direct-mail letters each week.

The Republican National Committee, which invested in its computer system as early as 1976, is far ahead of the Democrats with respect to the amount of computerized resources available to it. It holds a 7:1 advantage over the Democrats in the amount of direct mail it is able to generate and the number of donors and potential donors residing on the committee's data base.

The Republican National Committee also uses its system for sophisticated intracampaign communications via internal electronic mail, automatic telephoning and ready-made press releases and proposed speeches for nonincumbents around the country.

When the Republicans first listed their donors on a Digital Equipment Corp. Decsystem 2060 with 6M bytes of memory in 1976, they started with about 25,000 names. By the 1982 election, that number had risen to 1.6 million, compared with the Democrats' base of 300,000 names residing on an IBM System/38 mainframe the committee purchased last March.

"We started a lot later than our opposition, and we're funded at a much lower level," conceded Ed Mills, management information systems director for the Democratic National Committee. "But I think

we're closing the 7:1 ratio. We won't achieve parity by 1984, but we will close the gap. It's a long process."

The use of computers in elections has increased dramatically over the past few years, affecting every aspect of the political arena. In 1984, compared with two years ago, the number of state and local candidates using microcomputers to bolster their campaign strategies is likely to triple. For less than \$10,000, a candidate can maintain some 200,000 names. And the 1984 presidential election is certain to pivot around the almighty megabyte more than ever before.

While it is hard to be a question of how many votes a candidate could buy for his dollar, the question now is how much computing power can be purchased. For instance, for the \$12 million a political action committee pumps into a direct-mail drive, only \$2 million is generally made to give to candidates.

Long-Term Implications

While there is little doubt that the introduction of computers into the electoral process is changing the face of elections in America, at issue are the long-term social implications for com- , ters in politics.

"I'm certainly aware that the strategists want to balance the scales," commented Marc Rotenberg of the Public Interest Computer Association in Washington, D.C. "But if you're taking a step back and examining computers in the political process, you have to go back to some fundamental questions."

There have always been situations where one party has power over the other," Rotenberg said. "The question you have to ask is what the new technology brings to the circumstances. We have increasingly refined data about people's life-styles, incomes and membership associations. The level of information is carried much further than would have been possible in the past. We have begun in a sophisticated way to turn a political body into a commercial market."

A candidate's principal concern, Rotenberg said, is often with swing districts, where different types of people are examined together with pertinent factors such as their income and employment levels. If unemployment, for instance, is very high in a district, a candidate will stress new jobs.

"These things aren't new," Rotenberg said. "The question is what the computers do to that situation. The computer is a very powerful tool. For people who feel it wasn't the intention of our political system, it might be cause for concern. With technology, there's a point where a quantitative difference makes a qualitative difference."

"The extent to which computers are helping or hindering is difficult to judge," Rotenberg said. "Many politicians are more concerned with evening the game than the long-term perspective."

Behind every elaborate computer system, of course, is a lot of money—\$1.5 million in the case of the Republicans and their mainframe.

A hefty war chest invested in sophisticated technology can often, if not always, be a pivotal factor.

In the 1982 New York gubernatorial race between Mario Cuomo and Lew Lehman, for instance, Lehman spent some \$8 million on his campaign. Lagging behind Cuomo in the polls, he sent letters to completely different constituents, custom-tailored to each group's different concerns. Lehman lost the election, but his last-ditch effort helped him narrow the gap considerably.

There are others, more subtle effects that the technological age can have on the electoral process.

Appropos the connotations that '1984 has carried ever since George Orwell wrote his ominous book by that title four decades ago, computers in the next election have introduced a new dimension into the voting procedure itself.

"If you felt that in general your political ideas were somehow being observed and correlated, you might change your patterns and possibly even your political opinions in order not to come under the heading of 'subversive,'" warned Michael Goldhaber, director of technology projects at the Institute for Policy Studies in Washington, D.C. "So you might feel that what you did in the voting booth was an extension of that."

Along with others, Goldhaber is concerned that the relative newness of such a rapidly changing technology makes it difficult for people to understand and work with computers, thus making the possibilities for new forms of manipulation a real danger.

Big Brother

"Obviously, before computers were around, there were other means of intimidation," Goldhaber said. "But it's not so much what computers can do, but that they are sensed as Big Brother. In the voting booth, you're never quite sure how secret the ballot is at this point. Uses of all sorts of procedures and polling can alter and manipulate the public mood."

According to Christopher Arterton, an associate professor of political science at Yale University, there are positive aspects to the presence of computers in the political process. "Instruments of communications have been so blunt in the past that candidates haven't been able to talk very specifically about issues they stand for," Arterton said. "Now candidates will be much more specific about programs they stand for and will speak to issues they know audiences will be interested in. That is, they will speak in detail about x and y with out necessarily having x and y be contradictory."

Said political analyst Goldhaber: "I see the great challenge is to find ways to use new technologies to promote some sort of common human feeling, to maintain the sense that we're all part of the same community at bottom. In my view, that's the heart of any effort to have a democracy."

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Third-Generation PBXs



Making the Right Choice

By Katherine Hafner

As private branch exchange technology floods the marketplace, the lines between successive generations are less distinct than ever before.

Before 1975, all PBXs were considered first generation — voice-only, with manual switching via a console operator. When Rolm Corp. and Northern Telecom, Inc. introduced their digital PBX systems, the second generation came and brought about a revolution.

Although second-generation PBXs were designed to carry voice only, they have since been modified to allow for data. But enhancing a

voice-only PBX to carry data proved expensive and inadequate.

Thus, in 1980, the third-generation PBX was born, along with the concept of introducing the computer into the switching system itself. Designed to carry both voice and data, third-generation PBXs feature T-1 interface capabilities, remote switching units and nonblocking architecture.

Nonblocking capabilities can be of paramount importance when installing a voice-data PBX. Because voice conversations are generally short, in a voice-only system it is usually unnecessary to include enough talking paths to accommodate each pair of ports. Third-gen-

eration PBXs are "nonblocked," meaning they can handle the traffic load when all ports are busy.

As opposed to a blocking mode, where data transmitted carries a one-in-500 chance of blocking, nonblocking architecture carries a one-in-a-million chance of blockage. In addition, nonblocking architecture handles high-speed and low-speed data, voice and video, all in a nonblocking mode at relatively low cost.

Perhaps the most distinctive characteristic of the third-generation PBX is the fact that data-switching capabilities are not retrofitted on the system.

(Continued on Page 104)

Katherine Hafner is a Computerworld staff writer.

The Inter Now it takes even less



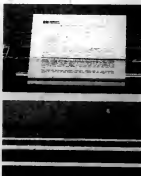
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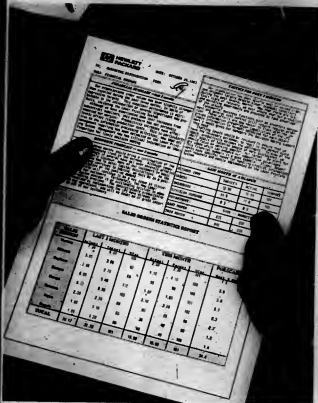


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(Continued from Page 101)

"That's an important consideration," commented George Colony, president of Forrester Research, Inc., a Cambridge, Mass., consulting firm. "If you're going to have 10% to 20% of your handsets attached to terminals requiring large blocks of information moving through a PBX, you'll need a fast internal matrix and a high bandwidth matrix."

Starting with Intecom, Inc. and the introduction of its IBX in 1980 [CW, July 19, 1982], third-generation PBXs have inundated the market in the past two years: AT&T with its System/85; Mitel Corp. with the SX-2000 (to be installed in the third quarter of 1984); and Siemens Communications Systems, Inc. with the Saturn II and Saturn III, to name a few.

And just as users have familiarized themselves with the various third-generation PBXs available on the market in 1983, yet another advance in technology is sneaking up on them: so-called fourth-generation PBXs.

Depending on which side of the debate you choose to tune into, a fourth-generation PBX can assume two different guises: It can be a souped-up version of a third-generation PBX and labeled fourth generation for the sake of advertising hype; or a fourth-generation PBX can be viewed as a legitimate term for a brand new product, which is local-area-network-based, with simultaneous voice and data capabilities.

Specifically Zitel, Inc., with its Private Network Exchange (PNX) [CW, April 25, 1983] and CXC Corp. with its Rose, have announced systems that are said to combine the voice capabilities of a PBX with the short, bursty data traffic characteristic of a local-area network.

Whatever you choose to call the newest breed of PBX, it has sparked a brand new debate among communications soothsayers: Will the PBX eventually take hold as the most cost-effective and efficient method for short-haul communications, thus obviating the need for local-area networks?

Two Will Cohabit

The overriding opinion of many industry analysts is that the two technologies will cohabit.

"It appears that the industry is recognizing that the natural hub of any office will probably be a PBX," commented Alan Froms of the Eastern Management Group. "That's not saying local-area networks won't find a place. They will still be important for high data requirements and host-to-host exchange. But for routine office automation, the PBX will definitely step in."

"My feeling is the PBX will coexist with the local-area network, with the [local-area network] working as a connection for professional computers and handling the high-capacity functions, moving large documents or handling batch transfers to a nonimpact printer," Colony offered. "I suspect the IBM [local-area network] will coexist very nicely with the Boin CBX. That will be the first elegantly planned interface between the [local-area network] and the PBX."

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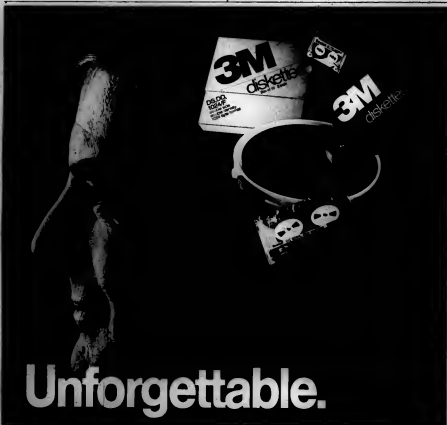
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THIRD-GENERATION PBXs

itself. They might even be sold together as a package."

As users remain wary of local-area networks, "mostly because of the tremendous wiring commitment," Colony said, "the user still understands that that kind of function is mandated within the company. Since the building is already wired for telephones, the first type of [local-area network] will be a PBX."

According to Colony, as the cost of communications lines diminishes between 10% and 15%, "it will be difficult for PBX vendors to make money just selling the PBX support," and future profits will lie in PBX applications.

Colony pointed to the significance of IBM's recent acquisition of 15% of Rolm in setting the pace for the future PBX market. "IBM is going to be a major new market dynamic in 1984," Colony said. "You're going to see Rolm distributing IBM products like the local-area network and personal computers. And you're going to see IBM distributing Rolm's CBX II. In fact, the Rolm CBX will perhaps become the prime market factor in 1984 because of its connection to IBM."

Strong Focus on Data

According to Colony, the major problem with next-generation PBXs is their strong focus on data. If a PBX is dedicated to data, the system's ability to handle voice can be greatly reduced, Colony cautioned.

"That's something the CXOs and Zeils have to watch out for," Colony said. "Because if you look at even 1987, in Fortune 1,000 companies with a third- or fourth-generation PBX, 75% of the capacity of the switch will still be going to plain old interactive voice. The mood is, 'Sure, give me the special features, but you've got to promise we'll never lose a conversation.'"

For the data and telecommunication manager who has been given the responsibility for deciding which of these advanced switching systems to buy, the choices can be extremely confusing, especially when augmented with a healthy dose of marketing hyperbole and a plethora of vendors to choose from. (In 1978 there were six digital PBX manufacturers; today there are 20.)

Shrewd Marketers

"Systems are being sold by vendors who have solutions looking for problems," commented Edward Horrell, president of Mitchell & Horrell, Inc., a consulting firm in Memphis, Tenn.

"These guys are shrewd marketers. They all claim to have what you want: low cost, the technology, experience and delivery dates. That's all well and good, but you have to identify your specific needs. It is very important to document a three- to five-year communications plan. You must identify what you want to do and where you want to be and how you're going to get there. It sounds obvious and mundane, but it's incredibly

Whatever you choose to call the newest breed of PBX, it has sparked a brand new debate among communications, soothsayers: Will the PBX eventually take hold as the most cost-effective and efficient method for short-haul communications, thus obviating the need for local-area networks? Many believe the two . . . will cohabit.

important."

According to Horrell, communications managers have traditionally been perceived as "hard dollar specialists," whose purchasing decisions have been based on a comparison of fixed charges with the Bell system.

"Those days are gone now," Horrell said. "Now the [communications]

manager goes in and says, 'These are our problems, these are the solutions and this is the cost. Because of that, the telecommunications industry is going to have to wake up soon in order to get up to snuff with the DP people.'

"I recently had a parade of vendors come through for two-hour presentations with my client and it's

always the last vendor out the door who looks the best. They all look good. The salesman makes them all look good," said James Morgan, principal at J. H. Morgan Consultants in Morristown, N.J.

Morgan suggests that companies in the market for a PBX designate a team of people for evaluating the products.

"In the past, when it was plain old telephone service, the telecommunications manager made the decision."

"The strong trend today is for a variety of people to make the decision. The team should consist of the telecommunications manager, the DP manager, the QA manager and the purchasing manager."

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EDITORIAL

Great Expectations

The American spirit took a beating in 1983. American lives were lost in the Middle East. Conflict and controversy raged in Central America. Tensions between the U.S. and the Soviet Union escalated dangerously. Even American relations with some of our closest European allies became strained.

Yet throughout the swings of the past several years from crisis to confidence, the march of technology has not only continued, but quickened dramatically. For most of us, its spread has been received joyfully, promising unimaginable new capabilities in information management, dramatic productivity improvements and the promise of a more fulfilling life-style.

But high tech has also brought with it an unprecedented concern about the potential for its abuse. Americans are coming increasingly to question our country's reliance on computers for its national defense. Revelations of the adventures of teenage "hackers" this year have made us realize how vulnerable our information resources really are. And, ignominiously, new evidence is emerging that Korean Air Lines Flight 007 took its ill-fated course as the result of a computer data entry error.

Also, many Americans now worry about the vulnerability of their privacy to computerized invasion. A recent Louis Harris poll found that 77% of Americans are concerned about this issue, up from 64% just five years ago (CW, Dec. 12).

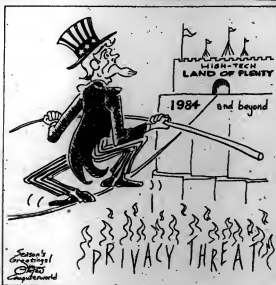
On the other hand, an overwhelming percentage of the survey respondents think science and technology has been generally beneficial. Over 90% see a big rise in productivity through the use of high tech in the work place.

The practical benefits of computers are becoming apparent in myriad new ways. New applications in expert systems have moved computers out of the hospital billing department and into the doctor's office, where they help physicians make more informed diagnoses. Computer-assisted design applications are helping engineers to work out potentially dangerous design problems before products reach the public. And Americans are discovering with delight that a computer in the home can be a welcome boost to their children's educations.

America's love/hate affair with the computer will intensify as the pace of technology quickens. The question remains which emotion will ultimately triumph. Clearly, public concern about the possible invasion of privacy from computers deserves notice. Legislation in this area is critical if computerphobia is to be overcome.

However, high technology also deserves an occasional pat on the back. Recent world events, at times, may have caused us to question the ability of humans to survive their own frailties. But computer technology has also set an example that we can all emulate. Even as suspicion about the motives and practices of some of our largest institutions has become ingrained in our consciousness, high-technology companies, with their high standards of competitive ethics, continue to top lists of the most respected companies.

As 1984 approaches, we cannot help but to be haunted by the specter of technological oppression raised by George Orwell's futuristic novel *1984*. However, we can also be buoyed by the possibilities that computer technology holds in store a truly better way of life. It is now more critical than ever that business and government unite to reassure the public that computer technology can and will be controlled. And it is up to all of us to applaud and encourage the true benefits we have gained from computer technology in recent years. Progress is stimulated by an atmosphere of acceptance, but stagnates in an atmosphere of fear.



LETTERS

Alternative Route

I agree with Harold Lundy's argument in the In Depth article "Justifying Subsecond Response Time" (CW, Nov. 21) that programmer productivity will improve significantly in the subsecond response time range. The question is: Will reprioritizing really help large TSO shops (and Roscoe or Wybur shops for that matter) ever come close to subsecond response time, especially when production consistently requires high priorities? The study does set the reader on the right path, but neglects to point out a fork in the road — and a path less traveled by.

Rather than shifting priorities and going through the gyrations that inevitably lead to an expensive CPU upgrade (and the same cycle of response time problems, reprioritizing and more upgrades and programmers working at all sorts of odd hours), a company should explore the alternative route, which is not only cheaper, but far better for the management information systems operation as a whole.

Many firms have taken the off-line, yet interactive, development route and reaped tremendous benefits as a result.

My firm needed a system that not only offered consistent subsecond response times, but powerful development tools, too — one that would allow us to continue programming in Cobol, communicate to multiple mainframes (from IBM and Sperry Corp.) and was, above all, affordable.

We found a product called Masetro, by Sofit Systems of San Francisco. It eats TSO's lunch (and Roscoe's and Wybur's), but not mainframe resources. Our programmers are not only twice as productive, but they're home in time for dinner, too.

Robert Gregory

West Orange, N.J.

'Not the Usual Piffle'

I'd like to thank *Computerworld* for publishing Barry L. Abramson's article "Reducing Security Risks Associated With VM Access" (CW, Dec. 5). This delightful piece of humor brightened an otherwise gray day here.

Abramson's situation is a perfect backdrop for comedy — sharing one VM virtual machine among six divisions. Where I sometimes pretend to work, a typical programmer will have six virtual machines for his own use.

Another masterstroke was to add the interminable series of prompts before allowing someone to edit a file. I invoke the EDIT command at least 100 times a day. I'm surprised Abramson didn't let his comic sense run free and have a team of system programmer commandos tunneling under the raised computer room floor to bomb the CPU into tiny pieces of silicon.

But the concept that makes Abramson's piece a work of genius, and not the usual piffle that we have to wade through in our daily lives, is the policy he describes of requiring all users to submit a written request for any given file to be erased.

What an idea! What opportunities for bureaucracy. The reams of paper. I can see it now: "Why do you want to erase that file? We'll just give you another zillion cylinders of storage — that way you can save everything."

I certainly hope Abramson has found a way to forbid people from using file modes A0 and A3, from giving out passwords and from insisting on working long hours from remote locations using dial-up lines. In fact, I hope Abramson finds a way to make sure that no power is provided to the CPU. That's a sure way to keep it secure.

Jonathan Seder

Menlo Park, Calif.

LECHT ON SCIENCE/Charles P. Lecht

George Orwell's Roasting: Medium-Well, Please

As we enter 1984, a crowd of folks who should be in the know have asked their opinions of this year's state of affairs as compared with those depicted in George Orwell's monumental work with that date for its title. Virtually all these experts will observe that if he meant his novel's somber social portrait to serve as an actual forecast for 1984, he was way off base. Often enough, they will go on to say that any real threat of Orwell's doer vision being realized could be indefinitely postponed by increasing our defense spending, developing better surveillance techniques, providing more "pointed" education on who our "enemies" are and exercising yet more intelligent control over our free press.

Indeed, I submit that if Orwell were around in 1984, he would surely be the subject of one of the grandest "roastings" of all time, although, curiously enough, there is ample reason to believe that it would be unwarranted. Notwithstanding the many discrepancies between the actual state of the world as we near 1984 and the vision Orwell would seem to have had of that same time, it is highly likely that his book was intended more as a parable or as an overarching cautionary tale than as a straight prognostication. Indeed, it was some time before Orwell was persuaded to accept the title by which his work came to be known; evidently, his preference had been for *The Man in Europe*.

To an extent, the subject and substance of 1984 were drawn from the

"Most every government, it seems safe to say, will take the position that the world in which it happens to be living is vastly different from Orwell's imagined one and, by its lights, vastly better. To the extent that any one of them would be prepared to acknowledge some Orwellian characteristics in itself, it would probably dismiss these as relatively minor (albeit warranted for some reason or other) when compared with the massive contamination afflicting the body politic in "enemy" countries."

(barely disguised) fears provoked in Orwell by sociopolitical tendencies emerging in the late 1940s, not only in the West, but in the East and elsewhere. He almost certainly was not offering a literal forecast for 1984, although it must have occurred to him that many people might think so.

Had he done no more than create a great and enduring sci-fi novel (which he did), he would, in 1984, have earned himself a degree of respect that rarely attaches to authors in that genre; for his ideas on totalitarianism were so thoroughly and convincingly worked through that he succeeded in giving to the language, in his own name and that of Big Brother, two shorthand terms by which the whole world now recognizes the sort of monstrous dictatorship that leaves us no moment or place of refuge from total terror. Whatever Orwell's actual intentions, we can be grateful to him for providing us with a special reason to reflect upon world government as we enter

1984 and to seek out new insights into it and ourselves. And this, we know, is always useful.

Orwellian Characteristics

Most every government, it seems safe to say, will take the position that the world in which it happens to be living is vastly different from Orwell's imagined one and, by its lights, vastly better. To the extent that any one of them would be prepared to acknowledge some Orwellian characteristics in itself, it would probably dismiss these as relatively minor (albeit warranted for some reason or other) when compared with the massive contamination afflicting the body politic in "enemy" countries.

Governmental variations upon this theme are as wide as the planet itself: from the Italians, who can be forgiven if they view any government they elect as fully Orwellian, after having lived through Mussolini, to the Soviets, who admit no trace

of Orwellianism, apparently, viewing their enforced reeducation camps in Siberian subzero temperatures as a rewarding experience for their citizens who do not share the Communist party's opinions.

Just how much Orwellianism exists in any country is hard to determine, but I think there is strong (circumstantial) evidence to support the thesis that the world described in 1984 has more or less globally arrived in 1984. Certainly, most of the world takes the view that most of (the rest of) the world is comprised of more-or-less Orwellian, totalitarian states. The roughly equally populated East and West blocs appear to hold that opinion of each other, and both of them behave as though they regarded the Third World in that way.

Instrument of Propaganda

Did or did not Orwell's work foresee that an inevitable fixture of 1984 would be "the enemy," an instrument of propaganda utilized by one's own government to keep one alternately enflamed or terrorized into submission to the strictures of one's local polity? One needs not look too closely at the "news" programming emanating from the respective Ministries of Truth of East and West to confirm this and actuality. Big Brother and his enemy seem almost to share the intimacy of the same object reflected in different mirrors, down to the last detail of olive branch and bomb.

Also, it is inarguable that Orwell's
(Continued on Page 108)

HUMAN CONNECTION/Jack Stone

User Emancipation From Big DP Brother: 1984

The reality of life in 1984, at least within the micron of the computer society, is far different from the dire predictions of George Orwell in 1984, wherein Big Brother and his followers placed the citizenry into a state of virtual slavery.

In the coming year, users are taking the strongest position ever to establish their independence from what many perceive to be the strangling bureaucracy of data processing departments. They are using the political leverage that derives from knowledge, experience and the headiness from installing successful systems themselves, albeit systems on the micro and small minis and, hence, of minuscule dimensions when compared with those running on the mainframes.

Not an insignificant number of users are even elevating themselves into lofty levels of arrogance, making the now oft-heard claim: "With only a personal computer and some quick code written for a \$400 generalized data base manager, I've come on-stream with a superpowerful information system." Indulging in such an attitude, and using their gift of gab, users are surely venting their past frustrations with their computer center dealings to the top-level deci-

"Without question, users are making life for DPs more miserable than ever; their ignorance in years past was difficult enough to deal with, but the high-and-mighty disdain for computer professionals that some of them display in real time after a few hours of fooling around with a personal computer is really tough to swallow."

sion makers and attempting to use their personal computer expertise as leverage to get control over the data processing establishment.

Without question, users are making life for DPs more miserable than ever; their ignorance in years past was difficult enough to deal with, but the high-and-mighty disdain for computer professionals that some of them display in real time after a few hours of fooling around with a personal computer is really tough to swallow.

User Pseudo-knowledge

However, to deal with the alarmingly rapid growth of user pseudo-knowledge of computer systems, the answer is not — and cannot be — to avoid it, but to address it head on and in calm, measured, intelligent and

rational ways. Here are some thoughts that may be useful to you if you are struggling with your users:

• If you have been around the business for more than just a few years, you surely know that for every generation of new equipment technologies, there arises a new wave of proliferation of machinery in the user areas that is typically acquired not with reasonable justification, but on a shelter-shelter, seat-of-the-pants basis.

The current explosion in personal computers is no different, except that it is not untoward to learn of users who select their personal in such bizarre ways than ever, such as how their first graders work with Logo. Surely, central coordination — or control — of personal computer acquisition is mandatory if the corpo-

rate coffers are not going to bleed to death from the constant demand from users for support of computing machines, software, documentation, training and, supply from every nook and cranny of the business.

• Your center must organize, if it has not already, a team of systems specialists whose role job is to work with the users and help them to separate fact from fiction and whinny from reality when it comes to the age-old issues of what computers can and cannot do and which ones are the right choices for the solution of user problems.

Users have to be straightened out on many matters that take as given, but that come as shocks of enlightenment to many of them, such as that disk space is not infinite and some software will not handle files spread across volumes; some systems installed on "fast machines" run agonizingly slowly because the software is poorly written; formal training sessions are not the end of user learning, but rather they are the beginning of a life-long, self-developing experience; and they should search for answers to their trivial technical questions in the documentation, though not by perusing the data processing department.

Orwell's Roasting: Medium-Well, Please

(Continued from Page 107)
description of individual freedom in 1984 fulfills many of our views of its actuality in 1984. His thesis envisaged the subjugation and enslavement of the people by an increasingly automated, mind-controlling state. Certainly, our Communist neighbors, in our judgment, have lent more than sufficient credence to this vision

of 1984. Alas, by theirs, so have we.

Startling, isn't it? Almost everyone in the world believes that the preponderance of the rest is in thrall to a Big Brotherly dictator. Each nation speaks of the slavery in which the governments of most others hold their respective populations; the enslavement process is said to be advanced by a group of

soulless (that is, robot-like) order followers, whose threats are validated in the eyes of a quivering, cowering citizenry by the appearance on their screens of a fleshless, Big Brother video image. Americans affirm that individual freedom in 1984 is Orwellian for at least 75% of our brethren here on Earth, by my reckoning. Not bad, as an example of accuracy in a futuristic

cy in a futuristic.

And what is there to say for Orwell's view of history and books in 1984? Subjected to brainwashing and physical torture, citizens are compelled to reread history — or fail to do so at their peril. They are adjured to understand that to control the history books (and their analogs) is to control and, thus, to invade history.

happily in today's Iran, Cuba, Vietnam, USSR, People's Republic of China, Yugoslavia, Poland, Czechoslovakia, Hungary, Rumania, Tibet and so on? The official alternatives to reducibility have often been unpleasant, when they have not been terminal.

Examples of Orwell's accuracy as a forecaster (never mind whether he aspired to forecasting) abound. In Beirut, an international peace-keeping contingent could attest that war is peace. It is hard to think of a single communist country in which we, as Americans, would not see their freedom as slavery; as to their strength, we would just as surely view it as the product of the most lamentable, state-enforced ignorance.

All right, all right! Nineteen eighty-four may not resemble 1984 all that closely, but it is still too close for comfort. Consider this excerpt from the diary of the novel's protagonist, Winston: "April 4th, 1984. Last night to the flicks. All war films. One very good one of a ship full of refugees being bombed somewhere in the Mediterranean."

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

Revised Histories

Since the turn of this century alone, many countries have seen fit to revise their official histories in response to political upheaval, economic dislocation, population migrations and other such traumatic manifestations.

Not long ago, some Germans believed that they could revise history by burning books and that might even be more thorough if they incinerated a few flesh-and-blood authors and readers in the bargain.

It does not take too much imagination to intuit that the history of Persia endorsed by the Ayatollah Khomeini may vary from that promulgated by the supporters of the late Shah Riza Pahlavi. Could we argue against the importance of knowing how to relearn history if, having been born into yesterday's version of it, we now wished to live

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December 14, 1983



MSA Launches System Aimed At Two Types Of Manufacturers

ATLANTA — Management Science America, Inc. (MSA) has introduced packaged software tailored specifically for manufacturers with schedule-driven operations.

As a cost-free enhancement to the MSA Manufacturing System (MRP II), the features can be used by both repetitive manufacturers and job-shop manufacturers who have some repetitive processes in their operations, the vendor said.

According to the vendor, most manufacturers consider themselves either job shop or repetitive, although the majority are both.

The system operates on IBM mainframe hardware under Cullinet Software, Inc.'s (DMS, Datascom/DB, IBM's IMS and DL/I or Cincom Systems, Inc.'s Total data base management systems).

The schedule-driven capabilities combine MRP II, Japanese methodology and zero-based inventory concepts. Using those features, manufacturers can establish a production schedule, set a production rate, check on production progress and report on production vs. schedule automatically in an on-line, real-time environment.

According to the vendor, the system provides maximum support of "just-in-time" inventory policies. It gives manufacturers stringent control over their materials and labor, since it automatically reduces inventory and accounts for labor used at various checkpoints in the production process, the vendor said.

The system is priced from \$150,000 to \$350,000, depending on the number of modules, hardware and operating environment.

MSA is located at 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

With TI, IBM; Service Also Introduced UIS Inks OEM Agreements

KANSAS CITY, Mo. — United Information Services, Inc. (UIS) has announced its entry into the microservices market with the signing of multimillion dollar OEM agreements with Texas Instruments, Inc. and IBM and the introduction of its Vista Service.

According to the company, Vista integrates microcomputer hardware and software into the UIS worldwide communications network and large-scale host and application software services. The OEM agreements authorized the sale of TI's Professional Computer and IBM's Personal Computer with the information services of UIS. Vista currently works with TI's Professional Computer, and UIS said it plans to announce the IBM Personal Computer link in January 1984.

In addition to providing stand-alone processing capabilities, the microcomputers reportedly will act as a window to UIS's teleprocessing services. The interface software — dubbed Vistacom — included at no extra charge with the micro-

computer, is said to control all asynchronous communications with UIS host services.

A spokesman for UIS said that when host computer services and communications are needed, Vista users will have the ability to link into UIS's teleprocessing network. Micro software packaged with Vista will enable users to perform word processing, spreadsheet, business graphics and records management functions. All third-party software written under Micro-Soft, Inc.'s MS-DOS operating system will run on the micros without modification, the spokesman said.

Prices for Vista range from \$5,545 for the base unit, which includes the system unit, CRT terminal, 256K bytes of random-access memory, internal modem, MS-DOS and one-year on-site maintenance, to \$6,910 for the base unit plus a Winchester disk drive and a 150 char./sec printer.

More information is available from UIS, which can be reached through P.O. Box 8551, Kansas City, Mo. 64114.

Sorting Techniques Enhance Release 6.0 of IBM's DF/Sort

WHITE PLAINS, N.Y. — New sorting techniques that are said to enable large systems to handle more applications are included in Release 6.0 of IBM's Data Facility Sort (DF/Sort) for IBM MVS and MVS/CA operating systems.

The new version reduces sort time by 14% to 40% over IBM's OS/VS Sort Merge Release 5, the vendor said. Enhancements to Release 6.0 include improved fixed-length record sort performance; improved variable blocked, spanned record sort performance; sort performance optimized to larger region sizes; and improved merge

performance for variable-length records.

The product is also said to feature improved message handling, new statistics messages; improved installation/execution options; extended parameter list support and MVS/CA support. It also includes several functions from IBM's DOS/VS-VSP/Sort/Merge Version 2.

DF/Sort operates with all processors supported by IBM's VSI, MVS or MVS/CA. A basic license is \$231, with a distributed systems licensing option charge of \$173 available through IBM, 1133 Westchester Ave., White Plains, N.Y. 10604.

Investigating Financial Modeling Alternatives

By Len Bergstrom
Special to CTV

Once the company's criteria have been established, you are ready to investigate the alternatives. Both general and specific criteria should be evaluated.

General criteria relate to the vendor, while specific criteria are associated with the financial modeling systems themselves. Positive and negative dominant factors should be identified for either category and applied to the full range of potential candidates.

The remaining criteria are then established by major categories (such as modeling and reporting) and weighted by elements (such as financial functions and graphics) within each category. Critical requirements should be emphasized more heavily. Remember that 100% satisfaction is rarely accomplished. Your goal should be to select a product that best fulfills the majority of the company's requirements.

An overview of remote computing services vendors can quickly and easily determine whether a vendor has the general characteristics required. A vendor's history and outlook can provide a comfort factor for subsequent dealings. Also, the type of hardware and operat-

In the first part of this two-part series, Len Bergstrom defined some of the criteria you should establish before investigating the alternatives of financial modeling software. Bergstrom now provides some guidelines for investigating the alternatives:

ing software may or may not be compatible with needs. Of more direct significance is the availability of the network relative to corporate locations.

Application availability is of prime importance. What major financial systems are available and how do they relate to one another? What about data management? Are your areas of importance able to be accommodated with major systems or companion products? What external data bases and access mechanisms are offered? What are the vendor's future plans? Other areas to consider include pricing structures, service options, system reliability and support, documentation, training and consulting.

If you are evaluating a system for use in house, you should be concerned with

product capabilities and the viability of the vendor. The majority of software vendors are relatively young and small, so the kind of general criteria used for remote computing services vendors may not apply. The user must also be concerned with contract negotiations, including performance guarantees and rights to source code under certain conditions. Installations of the product by multiple companies help insure against potential disaster.

Once you determine that a vendor meets your general criteria, analyze whether specific criteria are met by the financial modeling system. Financial systems components are very different according to individual planning systems, both in regard to specific integral components and in style of implementation. Although most claim to be "English language," the low range is actually close to a true programming language. Special attention should be directed to report generation, functions for financial and statistical operations and ease of use of documentation.

Some vendors say everything needed by the user should be embedded in a single system. Others adopt the philosophy of concentrating on specific activ-

(Continued on Page 114)

SOFTWARE & SERVICES

Startech Announces Release 2.0 of 'Viewcom'

WOODSIDE, N.Y. — Startech Software Systems, Inc. has announced Release 2.0 of Viewcom, an IBM CICS printer terminal spooling and automatic batch report distribution system.

Viewcom's IBM Personal Computer option supports printing from an IBM mainframe running under CICS to be directed to up to three printers connected to an IBM Personal Computer, transparent to the applications running on the Personal Computer, a spokesman said.

This feature can print multiple reports concurrently from the mainframe's CICS Viewcom print queues. A maximum of three printers per Personal Computer can be active simultaneously.

The Viewcom interface runs as a background task in the Personal Computer, independent of the Personal Computer application.

Viewcom Release 2.0 provides automatic transfer facility from the batch spool queue as well as automatic security checking with user exits. Additional functions include automatic unattended printing of reports, a virtual multiregion option and inter-systems communications capability of routing any report in the Viewcom queue to another CICS address space in the same CPU or in a remote CPU to any remote job-entry station or the central-site printer. These Viewcom features will also function

in a multiregion option or inter-systems communications environment, Startech said.

In addition to these routing capabilities, Viewcom allows instant report auditing by allowing users to access sections of the report before printing.

DOS/VSE support in Viewcom Release 2.0 has been enhanced to provide both automatic and interactive on-demand batch report transfers to the on-line CICS Viewcom print queue.

Viewcom Release 2.0 costs \$4,995 for DOS and \$7,995 for OS packages from Startech at 25-39 Borough Place, Woodside, N.Y. 11733.

Intel ImaX 432 Release For Its IAPX System Out

SANTA CLARA, Calif. — Intel Corp. has announced a release of the ImaX 432 virtual memory operating system for its IAPX 432 micro-mainframe system line.

According to Intel, the ImaX makes available blocks of main memory that contain data that is no longer being accessed and puts them through a process known as "garbage collection," which involves the deallocation of these unused memory blocks. After deallocation, the system performs a compaction process whereby it combines various-size blocks into large contiguous blocks to provide ample memory capacity.

Written in Ada, ImaX 432 is said to

make use of Ada's generic package concept. For example, the vendor said, a generic I/O sink module can be used to send data from a port to a disk system, a CRT display, a line printer or a laser printer. The programmer takes the generic package or module and fills in the specific information determined by the type of output device. The programmer does not have to write the entire output driver module and can instead work with the appropriate ImaX generic module.

The cost of ImaX is determined by quantity. The first copy is priced at \$8,000 from Intel at 3065 Bowers Ave., Santa Clara, Calif. 95051.

Announcing the State of the Smart.

IBM 3270 Personal Computer

Receipt Aid From CSU Runs On NCR 2950

CHICO, Calif. — California State University (CSU) at Chico has announced a cash receipting software package for use with the NCR Corp. Model 2950 terminal.

According to a CSU spokesman, the package prints receipts, locates and displays information about the transaction on the terminal, prompts for needed data and, at the end of each cashier cycle, transfers the data collected to a Control Data Corp. Cyber series mainframe. The package also is said to print reports with varying levels of detail, and it updates several subsidiary systems. It was designed to interface with the system-wide Financial Accounting System.

The vendor said that the program is easy to modify because of its modular structure.

For each transaction, a cashier selects the screen for that transaction type, then follows as it prompts for information. When the transaction is complete, a receipt is printed, a journal tape is printed, and checks are endorsed by all number and receipt number.

The cash receipting package is said to be a collection of programs written in NCR Basic and Cobol. The NCR Basic programs operate on the NCR Model 2950 terminals, and the Cobol programs operate on the Cyber processor.

The package is priced at \$5,000 from CSU, Chico, Business Affairs Office, Chico, Calif. 95929.



Utility Offered for MVS/XA

HOLMDEL, N.J. — CGA Software Products Group, Inc. has introduced a data center management utility designed for IBM's MVS/XA operating system.

According to the vendor, Single Image Software Version 7.1 is able to simplify error-handling diagnosis and reduce the number of load modules and library size requirements for the operating system. It reportedly supports recent IBM program temporary fixes in the MVS operating system.

The software is now available for lease at \$625/mo per site with the vendor's Multiple Systems Integrity Facility, \$7,500 per year with the Global Console Director, \$7,512 per year with the Multiple Systems Manager and \$1,525 per month or \$18,300

per year for all three, according to a spokesman for the vendor.

Additional information about the utility is available from CGA Software Products Group, which is located at 960 Holmdel Road, Holmdel, N.J. 07733.

System Utilizes HP's Image DBMS

PHOENIX — EDP Construction Systems has introduced the CAS/3000, a menu-driven, interactive, real-time construction accounting system which utilizes Hewlett-Packard Co.'s Image data base management system on the HP Series 3000 processors.

According to the vendor, all subsystems are totally integrated, allowing single-entry processing and mul-

tion or temporarily hidden when not in use. Information on the screen can be processed, printed or exchanged between windows. And the 3270 Personal Computer can be programmed by the data processing professional to meet the needs of each end user or department.

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Lexis, Nexis Now Available Via IBM Personal Computer

DAYTON, Ohio — Mead Data Central, a division of Mead Corp., has announced that its Lexis and Nexis data base services are now

available via the IBM Personal Computer and other terminals.

Lexis and Nexis, previously available only via terminals leased from Mead Data Central, reportedly can be accessed through the IBM Personal Computer, the IBM Displaywriter, the IBM 3101 terminal and the Televideo 950 terminal.

The company also has reported that it is negotiating with other computer manufacturers regarding the use of those computers to access the data base services.

Prime-time connect rates for Lexis and Nexis reportedly are \$90 per hour for up to five hours monthly, \$75 per hour for six to 10 hours, \$60 per hour for 41 to 100 hours and \$30 per hour for more than 100 hours. Off-peak rates are \$45 per hour for less than 100 hours and \$30 per hour for more than 100 hours. In addition, there is a surcharge of 45 cents for each word search unit.

More information is available from Mead Data Central, 9393 Springboro Pike, P.O. Box 933, Dayton, Ohio 45401.

Source Members To Receive E-Com Service

MCLEAN, Va. — Source Telecomputing Corp. has announced that members of the Source, its on-line information and communication service, will now be able to utilize the U.S. Postal Service's Electronic Computer-Originated Mail (E-Com) from their microcomputers.

According to Source Telecomputing, the E-Com service provided on the Source is contracted through an E-Com-certified telecommunications carrier in New York, where messages are received from members of the Source, batched, processed, sent on to serving post offices and delivered as first-class mail. Reportedly, the arrangement allows individual members to use E-Com as often as necessary without having to send a minimum of 200 messages per day, which is required of E-Com's corporate clients.

E-Com is one of several messaging services provided through the Source. Messages can be composed on-line using the editing capabilities of the Source or off-line where they can be uploaded for electronic delivery. The three primary messaging services are E-Com, which costs \$1.35 for the first page and 25 cents for subsequent pages; Western Union Mailgram messages, which range in cost from \$3 to \$5.15; and Source-mail, which delivers messages to any other member of the Source beginning at 13 cents per minute.

The Source is said to be compatible with any microcomputer or terminal and can be accessed via a local telephone line in 500 U.S. cities. Costs include a one-time \$100 membership fee, with basic hourly connect charges ranging from \$7.75 to \$20.75 from Source Telecomputing, 1616 Anderson Road, McLean, Va. 22102.

If you're looking for a personal computer that will satisfy your company's professionals and managers, IBM now has exactly what you need. The new IBM 3270 Personal Computer.

The fact is, many personal computers can be too personal for many business environments. Not the 3270 Personal Computer. Its strength is the ease with which it communicates with IBM hosts and office systems—in the next room or around the globe.

The 3270 Personal Computer is designed to accommodate the way people actually work. It can display in color up to seven windows of information at one time. Four with data from host computer applications (on the same or different hosts), two electronic notepads and one personal computer session. And despite its impressive capabilities, the 3270 Personal Computer is small enough to sit on a desk without taking it over.

The information windows can be moved, just as a person moves papers on a desk. They can be made bigger or smaller, put on top for immediate atten-

The Smart Desk from IBM.

Genesys Launches 'Search-All' for IBM DOS, OS

LAWRENCE, Mass. — Genesys Software Systems, Inc. has announced what it describes as a one-billion human resource information and decision system for mainframes

using IBM's DOS and OS.

Search-All reportedly is designed to work with Genesys' IBM Payroll Accounting, Personnel Administration and Deferred/Cafeteria Benefits

Management Systems. It is said to integrate into one application capabilities such as query, information generation, on-line report writing, modeling and forecasting.

Search-All is said to let users decide what to look for and what to do with it in determining alternatives and to refine qualifications continually. The system is said to be menu

driven, eliminating the need for users to know complicated syntax.

According to Genesys, Search-All will be available Feb. 1 as a free add-on feature for its All-Screen package, or at \$40,000 for DOS systems and \$45,000 for OS systems. All-Screen reportedly costs \$35,000. Genesys may be reached at 20 Ballard Way, Lawrence, Mass. 01843.

Price Hike Announced for 'DOS Jars'

McLEAN, Va. — Johnson Systems, Inc. has announced an immediate increase in the price of its DOS Jars Job Accounting Report System for use in IBM's DOS and OS operating system environments. The new permanent license fee is \$7,500, including the DOS/Power/VS option, a spokesman said.

DOS Jars is an accounting, billing and performance measurement sys-

tem that enables users to account accurately and bill equitably for all resources used in the DOS and OS environment. The package consolidates information about computer resources on IBM's System 370, 30 series, 4300 series and compatibles.

Johnson Systems' Marketing Services Department is located at 8300 Greensboro Drive, McLean, Va. 22102.

IBM 5080 Gets Graphics Tool

BOULDER, Colo. — Precision Visuals, Inc. has announced DI-3000, graphic tools support for the IBM 5080 Graphics System.

The system can be utilized by system integrators and application de-

velopers in engineering, scientific and computer-aided design installations.

Written in Ansi Fortran, DI-3000 is an integrated system of 200 callable subroutines developed in accordance with both Core and evolving Ansi standards, the vendor said.

The package supports a range of graphics terminals and hard copy devices and simplifies access to more advanced hardware features by presenting the application developer with a "virtual device" interface.

Prices for a 25-year license including the new driver will depend on the IBM host machine's class but will start at \$12,000 for the 4300 series, \$15,000 for the 3030 series and \$19,000 for the 3080 series. The driver alone, which will be released concurrently with the IBM 5080 system, will range in price from \$2,000 to \$4,000 depending on mainframe.

Further information is available from Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301.

Tape System For HP 3000 Unwrapped

SAN JOSE, Calif. — Mednick Enterprises has announced the Tapes/3000 tape management system for the Hewlett-Packard Co. HP 3000 computer.

According to the vendor, Tapes/3000 reduces the risk of losing or overwriting data by requesting and cataloging magnetic tapes as they are used. The package reportedly also performs most tape librarian functions. It will accept data from on-line users and operators, from job streams and the HP 3000, and it uses the data to keep track of each tape in the system.

There are four programs in Mednick's tape processing system. The Tapes Maintenance program is used to maintain information about data set characteristics and tapes in the system. The File Request program is used to request input and output tapes to be used by the job or session. A Scratch program is used to automatically scratch all tapes that have expired according to the date or generation/version count. The Operator Utility program is for special cases such as handling missing scratch tapes, resetting in-use RACs, inputting non-HP-3000 tapes into tapes and getting the current Scratch tape count.

Tapes/3000 is priced at \$2,900 from Mednick Enterprises, located at 166C Arbor Drive, San Jose, Calif. 95125.

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To use INTELLECT, the natural language query system, all you have to do is ask—in everyday conversational English—and you'll retrieve. Immediately, in either text or full-color graphics.

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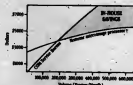
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*Average prices based on estimates from available data. 1982 hardware costs and maintenance estimates are included. © Kodak Komstar Company, 1982

Set of Design, Development Tools

National Semi Unveils 'Plan'

SANTA CLARA, Calif. — National Semiconductor Corp. has announced the Plan software package, a set of interactive design and development tools to simplify the implementation of systems with Monolithic Memories, Inc. Programmable Array Logic (PAL) devices.

The Plan system, according to the vendor, automatically selects the correct PAL configurations, reducing the amount of time spent in search and evaluation. The package consists of three programs, Plus, Serv and Prog, which were developed to guide designers from initial Boolean logic expressions through device selection and documentation to the actual programming of the devices.

The Plan package is said to interface with most programming systems and use notations similar to those of Monolithic Memories' Palasm design tools. Its comprehensive messaging operation includes error alerts, device-selection guidance and prompts.

Serv allows assignment of the previously defined logic to a different device and reassigns pin-outs, provides pin-out diagrams, fuse maps or equations to the CRT terminal or printer for documentation. Prog provides the logic and device data to a device programmer for programming or verification, automatically selects the proper PAL and pin assignments and creates a permanent disk file representing the defined logic equations and the device fuse

map in the chosen format.

The package is priced at \$195 from National Semiconductor, 2900 Semiconductor Drive, M/S D3698, Santa Clara, Calif. 95051.

Madic Adds General Ledger Module To Corporate Information System

SANTA CLARA, Calif. — Madic Corp. has announced a general ledger module as an addition to its Corporate Information System, an integrated closed-loop management information system for manufacturers and distributors.

The general ledger contains features that enable users to produce detailed financial statements from multiple levels of general ledger files and runs on Pick Associates, Inc. and compatible computers.

SEATTLE — Fiescom Corp. has announced the Fortran Engine Accelerator, which the company said can be used to off-load IBM mainframes

and Digital Equipment Corp. VAX-11 minicomputers.

The accelerator is reportedly a turnkey system that uses a Gould, Inc. Concept 32 superminicomputer and Fiescom's proprietary communications software executing in both the Gould processor and the host, which are connected by a high-bandwidth data link.

The Fortran Engine is said to allow an installation to recover large amounts of CPU resources that are currently consumed by computation-intensive Fortran applications.

The package offers conversion services to transport the existing Fortran applications to the Gould supermini, according to the vendor.

It will be priced at approximately \$500,000, depending on configuration, from Fiescom, which is located at 15245 Pacific Highway S., Seattle, Wash. 98188.

Selecting Financial Modeling Systems

(Continued from Page 109)

ities with interfaces to various functions. Again, user criteria determine what style is most appropriate.

An in-depth benchmark problem review should be performed to learn how different systems accomplish identical tasks. While this is not a complete answer, it can provide some solid comparisons from which

commonly used activities can be viewed. How easy are models to build and change? How does one ask "what if" questions, perform sensitivity analysis or do backward iteration or goal seeking?

Selected benchmark usage should be observed in light of the established criteria. If you need features such as automatic reordering of logic statements and the solution of simultaneous equations, the field of choice narrows dramatically. Benchmarks allow you to obtain an additional level of comfort. They are often "decision clinchers" in many feasibility studies.

Comparative cost factors need to be understood. However, it is not a simple matter of looking at the different costs of CPU time. Connect charges and storage costs can far outweigh the cost of computations. Personnel time may turn out to be the overriding factor. The availability of discounts, minimums and initiation of service charges must be considered. Also, differing rates for remote job entry and remote and local batch

processing can be influential, especially if you are willing to wait a few hours for results.

If you are selecting a product for in-house use, costs are a very different concern. Many authors offer their products on a free-trial basis before a license agreement is enacted. Maintenance, documentation, training and consulting are usually offered on a variety of terms. The effect of the product on system efficiency is difficult to ascertain unless the product is put up on your in-house environment.

The final step is to contact user references, especially those in your industry segment with similar applications and environments.

Now some disconcerting news: Once a system is carefully selected, your job is not complete. It is essential that users evaluate and periodically reevaluate their criteria and the changing means of satisfying those criteria.

Bergstrom is a principal and vice-president of consulting services at Real Decisions Corp. in Stamford, Conn.

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DMS-05 is a registered trademark of International Business Machines Corp.

Fortran Engine Accelerator Off-Loads IBM, DEC Units

SEATTLE — Fiescom Corp. has announced the Fortran Engine Accelerator, which the company said can be used to off-load IBM mainframes

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It will be priced at approximately \$500,000, depending on configuration, from Fiescom, which is located at 15245 Pacific Highway S., Seattle, Wash. 98188.

Innovator 300 LPM Printer System

Now Compatible with nearly any micro, mini, and mainframe.

The Innovator printer system can interface with your IBM, Burroughs, DEC, RS-232 Serial and many additional communication protocols. Also, the highly reliable, field proven Teletype™ mechanism provides years of virtually maintenance-free performance, significantly lowering your cost of ownership. Starting at...

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Ven-Tel Micro Modems Bow

SANTA CLARA, Calif. — Ven-Tel, Inc. has introduced four modems designed for use with various personal computers, including the IBM Personal Computer and Personal Computer XT and the Hewlett-Packard Co. HP 150.

All four are autodial, autoanswer, 1,200 and 300 bit/sec and are designed to run with varied software packages, including Microsoft, Inc.'s Crosstalk-XVI.

The modems are the PC Modem Half-Card, PC Modem 1200, HP Internal Modem and 1200 Plus.

The PC Modem Half-Card reportedly was designed to fit in the small expansion slot on the Personal Computer XT, leaving a standard slot for additional memory or other peripherals, and to fit in any slot of the Personal Computer. The system reportedly features automatic dialing and logon, terminal emulation and automatic data capture. It is priced at \$549.

The HP Internal Modem is designed to fit into one of the HP 150 expansion slots and is reportedly compatible with HP software, including DSN/Link and PFC. It is priced at \$425.

The PC Modem 1200 is said to be a full-size version of the PC Modem Half-Card, fitting in the Personal Computer, Personal Computer XT, Compaq Computer Corp. computers and Eagle Computer, Inc. computers. It reportedly will cost \$499.

The 1200 Plus stand-alone smart modem reportedly features LED lights on the front to allow easy

monitoring of the phone call and both a self- and a remote-diagnostic test. It is priced at \$499.

The four modems will be available in January. Ven-Tel is located at 2342 Walsh Ave., Santa Clara, Calif. 95051.



Ven-Tel, Inc. 1200 Plus

Transmission Units Debut, Said to Cut Errors, Misuse

CHERRY HILL, N.J. — Datatel, Inc. recently announced two data security units said to protect against unauthorized data transmission over telephone lines and to eliminate transmission errors for users of asynchronous terminals.

The DCP4010 Originating Unit is installed at the remote site, between terminal and modem, and the DCP4015 Answer Unit is installed at the central site, between computer and modem, a company spokesman said.

Each unit is programmed with a four-digit code that must be

matched by the two units at either end of the transmission link; the DCP4010 is programmed with four thumb-wheel switches, and the answering unit is programmed with four dual in-line package switches. Other features include a cyclic redundancy check for error detection and data retransmission and a 16K-byte buffer for storage and protection against buffer overflow, a vendor spokesman said.

Pricing starts from \$750 per unit from Datatel at Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

It took us five years to develop the best disk tape manager.

It will take you ten minutes to prove it.

Cable Tester For Technicians Out For RS-232

SEATTLE — Datacom Northwest, Inc. has announced an RS-232 cable tester with a remote indicator for use on the bench or in the field by data communications technicians.

The Datacom RS-232 Cable Tester reportedly tests by two methods — the manual step mode or the continuous scan mode. Fifty LEDs are said to indicate connections on each end of the cable, while three more LEDs indicate open, short or continuity for each connection of the cable under test.

The device reportedly operates with the Datacom line of breakout boxes and pocket cabling. According to the company, the device will be available in January for \$399. Additional information is available from Datacom Northwest, which is located at 11300 25th Ave. N.E., Seattle, Wash. 98125.



Modem Offers European Protocols

YOUNGSTOWN, Ohio — Western Datacom Co. has introduced an autoanswer, auto-dial modem that is said to enable any computer to telecommunicate with other modems located anywhere in the world.

Tektronix Offers Capability To 4115 Units

Worldcom 200 is a stand-alone unit that uses the protocol of the country called, while maintaining compatibility with Federal Communications Commission (FCC) and Bell system standards for connections to the U.S. switched telephone network. The same RS-232C connection used for data also accepts dialing commands compatible with most half-duplex modems.

According to Western Datacom, the Worldcom 200 features FCC Part 68 registration with European protocols and tone or pulse dial on 1,200 bit/sec half-duplex lines or 300 bit/sec full-duplex lines. Operating modes include Bell 103/113, Bell 202, CCITT V.21, CCITT V.23 and videotex.

The price of the unit is \$595 from Western Datacom, 5083 Market St., Youngstown, Ohio 44512.

Converters Eliminate Need for Leased Lines

HYANNIS, Mass. — Fibronics International, Inc. has introduced a pair of converters that use fiber optics between T1 modems or multiplexers, eliminating the need for leased telephone lines.

An FM-T1 converter translates into optical signals the 1.544M bit/sec bipolar T1 output and transmits the sig-

nals to the second FM-T1, which reconverts the information back to bipolar signals.

Prices for a pair of Fibronics FM-T1 fiber-optic converters start at \$2,000. Delivery takes two to four weeks. More information is available from Fibronics International at 218 Main St., Hyannis, Mass. 02601.

BEAVERTON, Ore. — Tektronix, Inc. has announced that its Autoconvergence capability is now a standard feature on all of the company's 4115 computer display terminals.

Autoconvergence is said to allow users to resolve the problem of color beams failing to intersect precisely at any point on a terminal.

Tektronix notes that beam convergence naturally drifts due to factors such as heat, position and equipment age, causing visual fatigue and loss of color information and images.

The 4115 terminal is priced at \$19,950, according to the vendor.

More information is available from Tektronix, which can be contacted through P.O. Box 500, Beaverton, Ore. 97007.

Broadcast Scheduled For Feb. 9

WASHINGTON, D.C. — Tele-Update '84, a regulatory update for major telecommunications users, will be broadcast from here Feb. 9 to various teleconference locations around the country.

Sponsoring the conference is Jon Taylor and Co.'s Satellite Seminars.

The four-hour program tentatively is planned to include three panel discussions. The discussions will focus on topics such as: access charges, bypass systems and universal service, featuring participants from government agencies and Bell operating companies; deregulation of equipment and services, with representatives of the Federal Communications Commission, AT&T, other common carriers and the interconnect industry; and state regulation.

The program will feature two-way audio communications, according to the sponsor, and advance registration is priced at \$75.

More information is available from Satellite Seminars through P.O. Box 356, Salt Lake City, Utah 84110.

CAN YOU FIND THE IBM* 3278 HIDDEN IN THIS PICTURE?



It's right there.

Inside the Advanced Personal Computer from NEC Information Systems.

In fact, the Advanced Personal Computer is the best personal computer for direct connect 3278 emulation, with 3274 and 3276 controllers.

Get the advantages of personal computing plus direct connect 3278 emulation.

With the APC, your people will be more productive than ever before.

They can easily perform all their existing 3278 applications. Then, with a single keystroke, switch to a full function personal computer, quickly



WITH A SINGLE KEY, SWITCH YOUR WAY FROM 3278 EMULATION TO A FULL FUNCTION PERSONAL COMPUTER.

and easily.

And the APC is fully compatible with all 15 different 3278 keyboard configurations.

And it offers a full range of communications protocols, including SNA/SDLC, asynchronous and bisynchronous.



A MAJOR INSURANCE COMPANY IS USING THE ADVANCED PERSONAL COMPUTER TO GREATLY INCREASE WORKER PRODUCTIVITY.

Prentice Announces Modem for Public Nets

SUNNYVALE, Calif. — Prentice Corp. has announced, the 9600 A/B which, the company said, is a 9,600 bit/sec modem that functions over public-switched telephone networks.

The unit reportedly also operates over less expensive 3002-type unconditioned lines, and in leased-line operation, the 9600 A/B is compatible with CCITT Recom-

mendation V.29. In both leased-line and public-switched network modes of operation, the unit conforms

to CCITT Recommendations V.24 and EIA Standard RS-232C, according to the vendor.

The modem reportedly is designed for high-volume data communications between pairs of multiplexers

in computer-to-computer data transfer applications or in medium-size to large networks. Said to be a compact desk model unit, the 9600 A/B incorporates advanced large-scale integration for reduced power consumption.

The 9600 A/B is priced at \$2,995 from Prentice, 266 Caspary Drive, P.O. Box 3544, Sunnyvale, Calif. 94088.

Seminars to Cover Micro Networks

March and April.

The seminars are set for Phoenix, March 8-9; Atlanta, March 15-16; Minneapolis, March 22-23; Washington, D.C., March 29-30; and San

Francisco, April 12-13.

The registration fee is \$645. Architecture Technology can be reached through P.O. Box 24344, Minneapolis, Minn. 55424.

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Find out more about NEC's Advanced Personal Computer.

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WITH THE ADVANCED PERSONAL COMPUTER, BUSINESS USES CLUTTERED AND PEOPLE ARE MORE PRODUCTIVE.

THERE ARE HUNDREDS OF PERSONAL COMPUTER SOFTWARE PACKAGES THAT RUN ON NEC'S ADVANCED PERSONAL COMPUTER.

Provides Centralized Data Base Netman Ready for VM/CMS Sites

SANTA MONICA, Calif. — California Software, Inc. has announced that its Netman data center and data communications management system is now available for IBM VM/CMS environments.

Netman is said to provide a centralized and integrated data base and to allow a user to perform inventory control, configuration management, order tracking, problem reporting, vendor analysis, failure notification, financial management, invoice verification, budget preparation and change management.

Netman VM/CMS includes more than 30 on-line screens, extensive batch and on-line reports and inter-

faces with popular report writer systems. It is said to utilize a single server machine to manage data base access for an unlimited number of users.

IBM's PCjr Gets In-Board System

NORWOOD, Mass. — Microcom, Inc. has introduced an in-board communication system for IBM's PCjr.

Called Era 2, the system includes a 1,200 bit/sec modem and communications software. It incorporates the Microcom Networking Protocol for transfer of text or data files between personal computers and any other personal computer, minicomputer or

Netman VM/CMS is available now at an introductory license fee of \$32,500 from California Software, 1460 Fourth St., Santa Monica, Calif. 90401.

mainframe. Era 2 also accesses remote data bases and utilities.

A free subscription to Dow Jones and an MCI Communications Corp. mail promotion are bundled with each Era 2 package. Priced at \$429 per unit, the Era 2 carries a four-year warranty from Microcom, 1400A Providence Highway, Norwood, Mass. 02062.

Racal-Milgo Adds Omnimode 96 To Modem Line

MIAMI — Racal-Milgo, Inc. has introduced an addition to its Omnimode series of modems.

The Omnimode 96 reportedly operates at data rates of 4,800, 7,200 and 9,600 bit/sec. The modem can reportedly be configured to operate with CCITT V.29 standards and for backward compatibility with the Racal-Milgo MP5 9601 or CMS 9601 modems. Test features for local and remote modems reportedly include standard tests, as well as CCITT V.54 loops.

Options on the modem include a Remote Modem Control and a multi-port option for four-port operation, allowing data rates to be assigned in any combination of 2,400-, 4,800- and 7,200 bit/sec, according to a vendor spokesman.

The unit price for the Omnimode 96 ranges from \$3,650 to \$5,350, depending on the configuration. More information is available from Racal-Milgo at 8600 N.W. 41st St., Miami, Fla. 33166.

Ku-Band Tech Focus of Meet For February

BETHESDA, Md. — Phillips Publishing, Inc. has announced a seminar to be held Feb. 16-17 in Washington, D.C., titled "Ku-Band Satellite Communications in the '80s."

The leader of the 1½-day seminar is Richard E. Wiley, former chairman of the Federal Communications Commission (FCC), one of the founding members of the law firm of Wiley, Johnson & Rein.

The topic of the seminar is the far-reaching impact which Ku-Band satellite technology will have on business and personal communications during the remainder of this decade.

According to the vendor, only one domestic Ku-Band satellite system is in operation, but the FCC has authorized an additional seven systems to be built and launched. The satellites are expected to have particular impact on business communications, because smaller earth station antennas for this band can be located on rooftops, making them accessible in high-density areas.

The price of the seminar is \$595 per person. Phillips is located at Suite 1200N, 7315 Wisconsin Ave., Bethesda, Md. 20814.

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"These Are Our Ancestors"

Compatible With IBM Personal Computer

Strategic Technologies Unveils Micro

ATLANTA — Strategic Technologies, Inc. has announced a briefcase microcomputer, the PC Traveler, which is software compatible with the IBM Personal Computer.

The unit weighs 28 lb and uses an Intel Corp. 80186 microprocessor. The PC Traveler uses Release 2.0 of Microsoft,

Microfilm Aid Ties Indexing, Addressing

KINGSTON, N.J. — Advanced Data Management and Intec Equipment, Inc. have announced Computer-Aided Retrieval (CAR) capability for the storage and access of microfilm documents for their data base management software product, DKS.

This capability combines the indexing and rapid addressing features found in computer data bases with storage capabilities of microfilming. CAR was designed to be compatible with Digital Equipment Corp.'s PDP-11 minicomputers and VAX series superminicomputers and IBM's System 370, 4300 series and 30 series mainframes.

The price for CAR ranges from \$15,000 to \$52,000. Additional information is available from Advanced Data Management through 15-17 Main St., P.O. Box 601, Kingston, N.J.

Inc.'s MS-DOS operating system and features a 94-in. diagonal gas plasma display with an 80-col., by 25-line format. The vendor claims to be the first to offer a micro incorporating a gas plasma display.

Other features of the unit include an integrated printer that can accept both letterhead and fanfold stationery. The printer can operate at 80 char./sec. and print 80 or 132 char./line. Multiple print fonts, character sets and dot-addressable graphics are also supported.

The PC Traveler includes a 6.254-inch cartridge disk drive. Conventional half-height diskette drives are also available, the vendor said.

The PC Traveler comes with 128K bytes of standard random-access memory, which is expandable to 256K bytes. In ad-



Strategic's PC Traveler

dition, the unit can be equipped with an internal modem.

The PC Traveler costs \$4,495. Strategic Technologies said from 7001 Peachtree Industrial Blvd., Building 3, Norcross, Ga. 30071.

CDC's Subsystems Boast 18M-, 30M-Byte Storage

MINNEAPOLIS, Minn. — Control Data Corp. has introduced two 514-in. Winchester disk subsystems that offer 18M and 30M bytes of storage, respectively. The units can be used with microcomputers employing an IBM architecture.

Called the Storgemaster 518 and 530 subsystems, the devices will be available in the first quarter of 1984 at Sears Bu-

iness Systems Centers and participating Computerland outlets, the vendor said.

Based on CDC's Wren disk drives, which previously were only available to OEMs, each subsystem includes a disk drive, power supply and fan. A single-board controller is supplied for installation, without adjustment, in the IBM Personal Computer processor unit, the vendor said.

The Model 518 costs \$2,595 and the 530 costs \$3,290, the vendor said.

In addition, CDC announced the Storgemaster Premium series of 514- and 8-in. flexible diskettes. The diskettes are offered with 48 or 96/100 track/in. densities with single- or double-sided recording. Storage capacities range up to 1M byte per diskette with various format options available. The diskettes are available in packages of 10 and cost approximately \$45 to \$65 per package. Control Data said from 2200 Berkshire Lane, Minneapolis, Minn. 55441.

drives. Memory can be expanded an additional 10M bytes with the hard disk option. Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s CP/M emulator operating systems are standard.

Priced at approximately \$3,400, the system is available from Polo Microsystems at 2570 El Camino Real W., Mountain View, Calif. 94040.

Polo Workstation Debuts

MOUNTAIN VIEW, Calif. — Polo Microsystems, Inc. has introduced an integrated personal computer workstation that includes monitor, dual disk drives and modem.

The Polo system is supplied with a 128K-byte CPU; expandable to 768K bytes, a 12-in. color monitor and two double-sided, double-density, 514-in., 360K-byte disk

drives. Memory can be expanded an additional 10M bytes with the hard disk option. Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s CP/M emulator operating systems are standard.

Priced at approximately \$3,400, the system is available from Polo Microsystems at 2570 El Camino Real W., Mountain View, Calif. 94040.

The RFB160, a half-size, 8-in. double-sided floppy disk drive,

Charles River Introduces Two Processors

FRAMINGHAM, Mass. — Charles River Data Systems, Inc. has added two 32-bit processors to its Universe line of superminicomputers.

Called the Universe 68/35 and the Universe 68/67, the units are based on the Motorola, Inc. 68000 microprocessor and incorporate a 32-bit Motorola Versabus I/O bus. The units also offer a 4K-byte cache memory, the vendor said.

The Universe 68/35 features a 514-in. Winchester disk drive with a formatted capacity of 35M bytes. The unit offers up to 3M bytes of main memory, and can support up to 64 users. The 68/35 uses an integral 8-in., double-sided, double-density floppy disk drive for program loading and backup storage, the vendor said.

The Universe 68/67 uses a higher capacity 8-in. Winchester disk drive with a formatted capacity of 64M bytes. A built-in 45M-byte streaming tape drive is used for system backup. The Universe 68/67 comes with 512K bytes of main memory, which is expandable to 5M bytes, the vendor said.

Like other products in the Universe line, the 68/35 and 68/67 support the Unix operating system as well as Charles River's Unos operating system, the vendor said.

The Universe 68/35 including 512K bytes of main memory with byte parity checking, 35M bytes of Winchester disk storage and 1.25M bytes of floppy disk storage costs \$14,900. Delivery time is 30 days, the vendor said.

The Universe 68/67 with 512K bytes of main memory, 64M bytes of Winchester disk storage and a 45M-byte streaming tape drive costs \$24,900. The unit will be available in the first quarter of 1984, the vendor said.

Charles River Data is located at 983 Concord St., Framingham, Mass. 01701.

Ricoh Releases Printers, Floppy, Plotter

FAIRFIELD, N.J. — Ricoh of America, Inc. recently introduced a number of peripheral products, including several types of printers, an IBM-compatible floppy disk drive and a four-color plotter.

Among the printers is the LP 4120, a tabletop laser printer that operates at 12 page/min. It weighs 112 lb and provides four interchangeable type fonts. The printer also features overlay and portrait/landscape conversion capabilities and can be interfaced to a variety of data processing and networking systems, the company said.

Ricoh's line of three serial impact printers features a double-sided printing, which is bidirectional printing. All of the printers accept optional forms tractor feeder, letter guide and cut-sheet feeder. The units range in speed from the 20 char./sec. 1200N to the 40 char./sec. 1500Q to the 50 char./sec. 1600Q.

The Ricoh TP-X is a thermal printer capable of printing up to 100 char./sec. The 24-element printing head delivers an output resolution of 180 dot/in.

The RFB160, a half-size, 8-in. double-sided floppy disk drive,

features double-density design that accommodates up to 1.6M bytes of storage. It is said to be compatible with a range of IBM units, including the 3740 and 32 drives, the 3600 and 4964 double-sided drives and System/34 drives.

Finally, Ricoh has introduced the GP-1, a four-color ballpoint pen plotter/printer for business and personal computers. At a printing speed of up to 120mm/sec, the GP-1 can print in black, blue, red and green ballpoint and felt-tip pen type. It features 26 plotter commands and an oil pen that is

said to last 1,000 meters.

The LP 4120, which has a suggested retail price of \$14,000, will be available from Ricoh in the first quarter of 1984. The serial impact printers will be available at the same time from retailer Hamill/Holt/Avnet. Suggested retail prices are \$900 for the 1200N, \$1,800 for the 1500Q and \$2,700 for the 1600Q. Prices for the TP-X, RFB160 and GP-1, which will be released in the second quarter of 1984, are not yet available. More information is available from Ricoh, 20 Gloria Lane, Fairfield, N.J. 07006.

SYSTEMS & PERIPHERALS

Multimodel Desktop Operates As Stand-Alone Using CP/M

MINNEAPOLIS — Computer Designed Systems, Inc. has introduced its Adviser Micro Plus, a multimodel desktop computer.

The unit can communicate with the company's Adviser series of interactive microcomputers or operate as a stand-alone system using Digital Research, Inc.'s CP/M operating system. Accounting and word processing software is available, in addition to programs for graphics and electronic spreadsheets, the vendor said.

The basic system comes with an

Controller Joins DEC Processors, Industry Drives

GARDEN GROVE, Calif. — An emulating 5¼-in. floppy disk controller, said to feature Zilog, Inc. 280-based design, is available from Distributed Logic Corp. (Dilog) for interfacing Digital Equipment Corp. LSI-11-11/23 Plus and Micro/PDP-11 processors to one or two 96 track/in., double-sided, double-density 5¼-in. floppy drives with industry-standard SA450 interface.

The Model DQ619 controller reportedly is contained on one dual-height printed-circuit board that includes all control and interface electronics for DEC RX02 disk drive emulation supported by DEC RT-11, RSX-11 and RSTS operating systems — without software patches or modifications.

The controller introduces dc motor control and includes 22-bit addressing for 4M-byte access, the vendor said. Other features include a full sector data buffer, on-board self-test and compatibility with DEC XLI data reliability diagnostics.

The Model DQ619 costs \$595 in quantities of 50. More information is available from Dilog at 12600 Garden Grove Blvd., Garden Grove, Calif. 92643.

Firm Announces RAM Board For IEEE-696 Bus

DALLAS — SDSystems, Inc. has announced the Expandom IV, a random-access memory (RAM) expansion board for systems based on the IEEE-696 5-10 bus.

The product comes with 256K bytes of parity-checked memory. The board supports both 8- and 16-bit data transfers and may reside anywhere in the 24-bit address space of the IEEE-696 bus, the vendor said.

The Expandom IV utilizes 150-nsec, 64K-byte dynamic RAM chips. The board is also designed to use 256K-byte RAM chips as they become available. The 256K-byte chip configurations yield a memory capacity of 1M byte, according to the vendor.

The Expandom IV costs \$1,145, the vendor said. SDSystems can be reached through P.O. Box 28810, Dallas, Texas 75226.

80-col. printer and a 12-in. CRT terminal that displays 80 columns by 24 lines. Also included is one 5¼-in. disk drive. Storage capacity of the diskette drive versions ranges from 500K bytes to 2M bytes; optional hard disk storage is available, the vendor said.

A standard feature is a detachable 96-key typewriter keyboard with a 10-key calculator pad. Micro Plus is available in either monochrome or color versions, the vendor said.

The base price of Micro Plus is \$2,000. More information is available from Computer Designed Systems, 10911 Olson Memorial Highway, Minneapolis, Minn. 55441.

Disk Drive Series Targeted At OEM, Mini Markets

SANTA CLARA, Calif. — Memorex, Inc. has introduced a series of 8-in. Winchester disk drives with 16M bytes of storage aimed at the OEM, small business computer and minicomputer markets.

The Memorex 230 series contains three models to match the storage requirements of small systems: Model 233 (83M bytes), Model 234 (1.1G bytes) and Model 236 (1.6G bytes). Each of the models has the industry standard storage module drive interface with a 1.2M byte/sec transfer rate, the vendor said.

The 230 series features 30-msec average access time with a switcheable option that permits cartridge module

drive interface users to integrate the drives without changing the interface.

The series permits 6.4G bytes of storage to be configured in the same space as a single 14-in. drive or 3.3G bytes in half the space, the company said.

Evaluation units will be available in January 1984, with production quantities available in March.

The Model 233 will be priced at \$2,420, the Model 234 at \$2,620 and the Model 236 at \$3,080.

More information is available from the vendor, which is located at San Tomas at Central Expwy., Santa Clara, Calif. 95052.

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Arbor Technology
Austin-Tate Inc.
AST Research Inc.
Benchmark
BGS National Inc.
BPI Systems Inc.
Robert J. Brady Company
Broad Communications
Brown Disc Manufacturing
Business Computing
CIX
Celestial Software Inc.
Cemex
Microelectronics
CompuLink
CompuShare
Computer Intelligence
Computer Knowledge Corp.

Computer Roomers
Computerworld
CompuShare Corporation
Contemporary
Computer Wear
Corona Data Systems
Corvus
CPU Corporation
Creative Computer
Products
Data Business Vision
Database
Data Storage Solutions
Data Translation Inc.
Decision Data Computer Corporation
Digital Communications Associates
Discreet Corp.
Distributed Logic Corp.

Dynast Distributors
Emulex Corporation
ENVAL Systems Inc.
ESC Technologies, Inc.
Everex Systems Inc.
Ferox Microcomputers
Hayden Book Co. Inc.
Hewlett-Packard Company
Human Edge Software Corp.
Magazette
Independent Computer Consultants Associates
Information Builders
Informix
InterWorld
Interface Inc.
International
— Computerized
— Linguistics
Interphase Corporation
Lennett Inc.
LPKF Pacific
Mac Software
MICRO
MARKETWORLD
Micro Design Inc.
Micro Line Inc.
Microtek Lab
National Instruments
NEC
Norvision
Omega Software Inc.
Omni Graphics Inc.
On Track Data Systems
OSM Computer Corp.
Palatrix Software
Parsons Line
Conditioning
P.C. Telemart
Percept Inc.

Personal CAD Systems
Perware
Phase Information
Machines
Prentice Hall Business & Professional Division
Printronics Inc.
QIC Corporation
Racal Vadic
Roland DG
RTICS/Real Time
Computer Science Corp.
Santa Clara Systems
Seque
Sensor-Based Systems
Software Watchdog Inc.
Software Centre
International
Software Solutions Inc.
Sorbus Service Division
MAI
Sperry Corp.
Sennamagraphics
Corporation
SWI International Systems
System Inc.
Systems Management
Associates
Tall Grass Technology
TCS Software
Televideo Systems Inc.
3M Data Recording
Products
Thunderbolt Corporation
Toshiba America Inc.
United Networking
Systems Inc.
Veritex Corp.
Verbatim Corporation
Vertex Systems
ZEDUCOMP

(Exhibitors as of Dec. 15, 1983)



Shugart Offers Winchester Series, Microfloppy

SUNNYVALE, Calif. — Shugart Corp. has introduced a series of intelligent 5 1/4-in. Winchester disk drives that reportedly provide device independence from CPUs and a double-sided 3 1/2-in., 1M-byte disk drive for desktop and portable computers.

The Shugart 7005 series of Winchester disk drives, the 7065 and 7125, are said to utilize intelligent small computer system interface controllers and half-height disk drives in an integrated, system-level product. The devices reportedly require only the connection of the drive to the host with a standard computer system interface cable for integration.

The 7065 is designed for a 5M-byte formatted capacity, and the 7125 offers a 10M-byte formatted capacity.

Both units reportedly have the intelligence to relieve the processor and controller of housekeeping functions such as formatting, data error detection and correction, defect mapping, data buffering, automatic retries and self-abortation.

Shugart's latest microfloppy disk drive is the Shugart 350, which the company says occupies only one-fourth the volume of a standard 5 1/4-in. minifloppy drive.

The 350 reportedly operates with the ANSI working standard 3 1/2-in. hard-shell cartridge media format, while providing 1M byte of unformatted capacity, 4-msec track-to-track access time and 80 tracks per side.

According to the company, the

350 may be incorporated into current systems with minimal impact on controllers and software investments and is quieter than minifloppies because it has only nine moving parts.

The 7005 series and the 350 will be available for evaluation during the

first quarter of 1984, with volume slated for the second quarter. The 350 costs about \$200 in OEM quantities. The 7065 costs \$661, and the 7125 costs \$716 in OEM quantities.

Shugart is located at 475 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Personal Computer Unveiled By Royal Business Machines

WINDSOR, Conn. — Royal Business Machines, Inc. has introduced a personal computer that features 64K bytes of random-access memory and the ability to handle programs written under Digital Research, Inc.'s

CP/M operating system.

Called the Royal Alphatronic Personal Computer, the system is based on a Zilog, Inc. Z80A microprocessor and includes 32K bytes of read-only memory (ROM), consisting of parts of Microsoft, Inc.'s Basic Interpreter. According to the vendor, the computer addresses a variety of professional business and tutorial applications.

Built-in interfaces connect a cassette recorder, two disk drives and a Centronics Data Computer Corp. type printer. An RS-232C communications interface has also been included for connection of printers, modems and other peripherals.

Any color or black-and-white television or professional-quality red-green-blue monitor can be used with the Alphatronic system. Depending on the monitor, the computer can display either 80 or 40 columns by 24 rows, allowing the flexibility of a wide range of programs. The system's high character resolution is provided by an 8- by 12-dot matrix, and eight foreground and eight background colors can be selected.

Keyboard features include a built-in 79-char. keyboard with 6 double programmable function keys (Acii layout), separate numeric key pad, separate cursor control keys, two oversize return keys, positive touch keyboard and card holder for key function references.

Options include a line of ROM cartridges, which plug into the top left side of the computer for optional game and tutorial software, and two disk drives — a 5 1/4-in. slim-line double-density drive with controller (320K bytes) and a 5 1/4-in. slim-line double-density drive without controller (320K bytes).

The price for the computer is \$695 from Royal Business Machines at 500 Day Hill Road, Windsor, Conn. 06095.

FEBRUARY, ALL EYES IN TO THE IBM PC.

Plus, we'll present personal computer experts from around the nation in an up-to-the-minute conference program. You'll learn how to choose and how to use the technology and equipment surrounding the PC family of microcomputers. Here's a partial listing of the conference sessions:

Wednesday, February 1, 1984

User Sessions:

The Benefits of the IBM PC for Small Businesses
Financing Options and Tax Advantages
Available Add-Ons and Peripherals
Software: What's Available and How to Find It

What Do the Compatibles Have To Offer?
How I Became Compatible With My IBM PC
Medical/Dental Applications for the PC
PC's and Real Estate
Manufacturing Resource Planning with the PC.

Investment Software for the PC
CPA Software: The Bottom Line
Software for Insurance Applications
Distributed Control Software for the PC

Thursday, February 2, 1984

User Sessions:

The Anatomy of the IBM PC
Defining Levels of Compatibility Between Systems
Overview of Compatibles: Desktops and Portables
Word Processing Software
Database Management Software
Business Graphics Software
Analyzing Your Software Requirements
Overview of Major Business Applications Software
Integrated Software Solutions

Friday, February 3, 1984

User Sessions: The PC in the Corporate Environment

Review of Policy and Planning Issues
Implementation Strategies
Use of PC to Mainframe Communications (Includes Security Issues)
Local Networking for the PC

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For general information, contact Mark Hall Associates at 1-800-328-1888.
For registration information, call Mark Hall Associates at 1-800-328-1888.

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Interface Cable Out From IQ

BELLEVUE, Wash. — IQ Technologies, Inc. has announced the SC817 Smart Cable, an RS-232 interface cable.

The product interconnects computer systems, terminals, modems, printers and other devices with an RS-232 interface. The cable consists of handshake lines used in specific applications and functions at transmission rates of up to 19.2K bit/sec, the vendor said.

The price is \$119.95, according to IQ Technologies, which is located at Suite 308, 11811 N.E. First St., Bellevue, Wash. 98005.

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Bits & Pieces

Two Nonstop Power Units Designed for Applications

DALLAS — Bits Power Systems, Inc. has announced two uninterruptible power supplies (UPS) for computer applications requiring dedicated, continuous and isolated electrical power.

According to the vendor, the units are always on-line. Utility line power is used only to maintain a full charge on the internal gel-type batteries.

Model UPS-200 and UPS-400 have visual, audible and remote alarm functions. Standard full load backup time from internal batteries is 10 minutes. External 12V batteries may be plugged into a connector for extended backup time and automatic charging, the vendor said. Four standard grounded output receptacles are provided.

UPS-200 (200W) measures 5-in. high by 13-in. wide by 16-in. long and weighs 35 lb. Model 400 (400W) measures 6-in. high by 16-in. wide by 18-in. long and weighs 55 lb.

The price for the UPS-200 is \$795 and \$995 for the UPS-400.

Further information is available from Bits Power Systems, Suite B114, 11020 Audelia Road, Dallas, Texas 75243.

Plug-In Security Module, Software Back IBM Micros

ANNANDALE, Va. — Advanced Computer Security Concepts, Inc. has announced a plug-in module and associated software that will prevent unauthorized disclosure or modification of confidential or proprietary data on the IBM Personal Computer or Personal Computer XT.

The module contains a Zilog, Inc. Z80 microprocessor, 4K bytes of random-access memory, a minimum of 2K bytes of erasable programmable read-only memory, buffers and flags, a software implementation of the Data Encryption Standard, interface software and data protection software that enciphers all data residing on a diskette or hard disk. The data is deciphered only after being loaded into the memory and is again enciphered before being written back to the disk file, the vendor said.

The system operates under IBM PC-DOS Release 2.0 and costs \$795. Further information is available from Advanced Computer Security Concepts, 4609 Logsdon Drive, Annandale, Va. 22003.

Desktop Chubb-9900 Offers Security Manager System

TORONTO — Chubb Engineered Systems has announced the desktop Chubb-9900, a computer-based security management system.

The unit can be handled by one operator and performs a variety of control/command functions, such as recording and controlling access via card readers, monitoring doors and intruder detection devices and signals heating, ventilation and air conditioning abnormalities. It can also unlock doors, turn lights on and off and sound required signals at pre-scheduled times or in response to specific conditions, the vendor said.

The system can handle 32 card readers, 5,000 pass cards and provide

monitoring and command functions for 1,000 individual zones.

Prices begin at \$35,000 and vary according to the size and complexity of the application, the vendor said. Further information can be obtained from Chubb Engineered Systems at 80 Horner Ave., Toronto, Ont., Canada M8Z 4X9.

Storage Control Device Simplifies Winnie Use

SAN JOSE, Calif. — Priam Corp. has introduced an intelligent storage control device designed to simplify integration of Priam Winchester disk drives into multiuser computer environments.

The Delegate DS201 reportedly manages combinations of up to four

5¼-in., 8-in. and 14-in. Winchester disk drives with data rates of up to 1.8M byte/second has ports for ¼-in. tapes and floppy disks.

It contains an autonomous microprocessor with its own memory and I/O controllers, allowing it to delegate operations with minimal host involvement.

The DS201 is the second Delegate-series control device. It offers the ANSC Intelligent Peripheral Interface rather than the Smart-T interface of the earlier DS101.

The unit will be available during the first quarter of 1984 at a price of \$975 in OEM quantities.

Priam Corp. is located at 20 W. Montague Expwy., San Jose, Calif. 95134.

Digital Optical Disk Drive Fits OEMs, Integrators

PARIS — Thomson-CSF Communications has announced the Giga-disc GD 1004, a read/write digital optical disk drive for OEMs and systems integrators.

The product is capable of storing 1G byte of formatted data on a single-sided, 12-in. optical disk. The unit is available in both a 19-in. rack-mountable version and a stand-alone tabletop unit, the vendor said.

The unit costs between \$6,000 and \$9,000 and is currently available in OEM quantities, the vendor said.

Thomson-CSF can be reached at 23 Rue de Courcelles, Bureau 8.02, BP 96-08, 75362 Paris Cedex 08, France.

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As Info Equipment Proliferates Flexibility Called for in Integrating OA

By Lynn Haber
CW Staff

FRAMINGHAM, Mass. — The critical role of communications for major business productivity gains has come to the forefront as the shift in office automation moves away from a fragmented approach toward a more integrated approach, according to a recent report published here.

"In present and future office

HP Package Provides Networking For Its 9000

PALO ALTO, Calif. — Hewlett-Packard Co. recently announced a network package to provide local-area networking among its HP 9000 32-bit computers running under HP-UX, the company's version of the Unix operating system.

The HP LAN 9000 reportedly connects Series 500 computers via an Ethernet-compatible 10M bit/sec link and is said to allow users with little or no data communications knowledge to gain access to files, transfer files within a network, start or stop processes on other systems in the network and automatically communicate between processes running simultaneously.

The system is comprised of a microprocessor-based local-area network unit linked to a host HP 9000 computer through a dedicated HP-IB interface, a company spokesman said.

The network unit is connected to a 10M bit/sec coaxial cable, and software from the host is downloaded to the network unit to handle the transfer of information from the computer to other computers on the network via a transceiver and a cable, according to the vendor spokesman.

The package is priced at \$5,035, and delivery is estimated at eight weeks after receipt of order. More information is available from Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303.

environments, the nodal points for the communications of information will include workstations, computers, file servers, printers and other peripherals, personal computers and other types of equipment, as well as telephones and memos on paper. The ability to link all of these requires more flexible and more fully connective communications methods than those used in the past," according to "Office Networks," prepared by International Data Corp. (IDC).

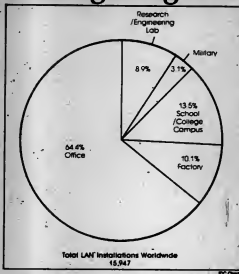
The report praised the broad range of information processing equipment available to meet the changing office automation needs, but cautioned against this great flux which has resulted in a lack of standards in an environment of rapidly changing technology.

With the availability of newer networking solutions for office communications comes the promise of higher level, cost-effective applications to support the automated office of the future. However, with this promise, some confusion exists," according to the report.

In the course of the study, IDC examined user needs and considerations for planning to implement an office communications network. Two important networking options explored were local-area networks and the voice/data private branch exchange (PBX).

According to the researchers, there are currently some 15,960 local-area networks of all types installed worldwide, with 64.4% of these in the office (see chart). The number of local-area networks installed worldwide is expected to reach 103,210 by the end of the year 1988.

The study also predicted an emergence of the PBX as a



Type of Premises With Local-Area Net Installation

means of office networking. A number of third- and fourth-generation voice data PBXs have already become available, and these are expected to compete against local-area networks.

"One constant theme throughout the report is the need for careful planning of an office network before any discussion of technology takes place. The network in place should support the desired applications, not dictate what applications are possible. The best office network is the one that satisfies present, as well as future, business requirements," the report said.

The report is available for

\$3,500 from IDC, which may be reached at Five Speen St., Framingham, Mass. 01701.

Corvus Out With E-Mail, Software

SAN JOSE, Calif. — Corvus Systems, Inc. has announced an eight-program integrated software package for its Corvus personal workstation and an electronic mail package for various personal computers.

The Corvus lvs software package reportedly integrates a word processing package, a 225-root by 127-col. spreadsheet, business graphics, list management, data communications, sorting, rapid information retrieval and desk tools.

Corvus lvs allows the user to transfer data between programs and among computers using the Corvus Omninet local-area network. Computers on the network reportedly can share numerical data, standard text paragraphs or lists from common mass storage systems.

Corvus Omninet is available for various personal computers, including those from Corvus; Apple Computer, Inc.; IBM; Digital Equipment Corp.; and Texas Instruments, Inc. It reportedly manages network mail traffic and allows users to track correspondence, edit, file and distribute messages and data parcels to several locations.

Corvus lvs, available now, and Omninet, set for delivery in the first quarter of 1984, are priced at \$495 each from Corvus Systems, 2029 O'Toole Ave., San Jose, Calif. 95131.

Inconix Local-Area Net Connects to IBM Micro

NATICK, Mass. — Inconix Corp. has introduced a local-area network that can be used for direct connection to the IBM Personal Computer via an RS-232 link.

The Cinchnet network provides for access by up to 124 Cinch Pac primary automation control units over a distance of 4,000 ft at a speed of 28.8K bit/sec without the need for polling, the company said. Each Cinch Pac offers local control intelligence for stand-alone operation without control instructions from or intervention by a host computer, a spokesman for the firm pointed out.

The combination of Cinch Pac with the Personal Computer via the network reportedly provides distributed digital control capability at a cost of about \$1,000 per loop.

More information on the local-area network is available from Inconix, which is located at 10 Teah Circle, Natick, Mass. 01760.

DG Offers Amber Screen

WESTBORO, Mass. — Data General Corp. has announced that its Dasher Model D210, D211, D410 and D460 workstations are now available with an amber video screen.

Said to be compatible with earlier green-phosphor Dasher models, the workstations can reportedly be used with existing applications,

including Data General's Compuserve Electronic Office (CEO) system.

The CEO package consists of word processing, information management and decision support products. The price for the amber monitors ranges from \$620 to \$1,610. DG can be reached at 4400 Computer Drive, Westboro, Mass. 01581.

OFFICE AUTOMATION

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PROGRAM	JOB NAME	CPU TIME (SECONDS)				I/O COUNT	
		NUMBER OF EXECUTIONS	USER	PCAS	DOWN	READ	WRITE
PROG001	JOBS001	1	2.38	2.38	211	211	
PROG002	JOBS002	1	0.72	0.72	1401	1401	
PROG003	JOBS003	1	110.44	12.27	20361	20361	
PROG004	JOBS004	1	304.81	81.71	20772	11782	
PROG005	JOBS005	1	0.40	0.71	1077	1077	
PROG006	JOBS006	1	0.13	0.18	1671	1671	
PROG007	JOBS007	1	0.08	0.10	708	841	
PROG008	JOBS008	1	0.20	0.21	811	871	
PROG009	JOBS009	1	10.10	0.21	1010	1110	
PROG010	JOBS010	1	0.18	0.18	101	101	
PROG011	JOBS011	1	0.01	0.10	101	101	
PROG012	JOBS012	1	0.10	0.10	101	101	
PROG013	JOBS013	1	0.10	0.10	101	101	
PROG014	JOBS014	1	0.10	0.10	101	101	
PROG015	JOBS015	1	0.10	0.10	101	101	
PROG016	JOBS016	1	0.10	0.10	101	101	
PROG017	JOBS017	1	0.10	0.10	101	101	
PROG018	JOBS018	1	0.10	0.10	101	101	
PROG019	JOBS019	1	0.10	0.10	101	101	
PROG020	JOBS020	1	0.10	0.10	101	101	

IBM 370/158

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To Increase 270% in '83, Report Says Floppy Drive Shipments Skyrocketing

MOUNTAIN VIEW, Calif. — Worldwide shipments of floppy disk drives in 1983 will total an estimated 55 million units, up a whopping 270% over 1982's shipments, while growth to 23.6 million units shipped is expected by 1986, according to a recently released report from Disk/Trend, Inc.

The report showed further that a surge in 1983 shipments has made two-sided, 5¼-in. minifloppies the dominant flexible disk drive configuration. The trend to half-high versions of 5¼-in. drives is well established, the report found, especially with two-sided models from the Japanese manufacturers.

Considering worldwide unit shipments of all minifloppy drives, more than 90% of two-sided drives and more than 60% of one-sided drives will be half-high models by 1986, the study reported.

In addition, Disk/Trend's annual survey found that IBM is expected to start internal production of two-sided, 5¼-in. floppies next year with a program that will increase to production of an estimated 1 million drives in 1986.

Distribution Of Software Electronically Fast Growing

By Lisa Raleigh
Special to CW

Electronic distribution of software is more than a probability favored by futurists. It's happening now, but is visible only for game software and other small programs at this time.

The potential for electronic distribution of business software will not be realized for many months and possibly years, according to industry analysts. Because business programs are so much larger than games, and because they require a great deal more support, many issues remain to be resolved.

It is already possible to download software from a central source via a modem to a retail store or even to an end-user location. However, the transmission of large programs requires a sizable chunk of time, sometimes more than an hour. Dealers wonder if their customers will sit still longer than 10 minutes waiting for a program to download.

Even if speed were not an issue, documentation and support remain untransmittable. An exception is on-line documentation, but that only makes large programs a target still. Also, even if big programs

(Continued on Page 132)

However, the company's consumption of minifloppies by that time will be so great that IBM will likely buy as many minifloppies as it manufactures, the report said.

IBM's Plans for Drives

The report also noted that IBM will start using 1.6M-byte, 5¼-in. drives on new models in its Personal Computer line, which will supersede older word processing and small business systems. This will stimulate IBM's competitors to use compatible floppy drives, creating an active market in the U.S. for the 1.6M-byte format, originated in Japan.

This format will capture more than one-quarter of the 1986 shipment level of two-sided, 5¼-in. drives, the study said.

Other findings of the survey included:

- Despite continued confusion over competing microfloppy standards and stern competition from half-high 5¼-in. drives, microfloppies are starting to reach significant production quantities, with next year's worldwide shipments up to 810,000 units and shipments of more than three million expected by 1986.

- Worldwide shipments of 8-in. floppies are flat at present, with a slight growth for two-sided drives offset by declines in shipments of one-sided drives. After 1984, shipment declines of more than 15% (20% in 1985) are expected for drives in this category.

- For the first time in 1982, a different company held leadership in worldwide OEM shipments in each of the product groups analyzed. Tandem Corp. led in two-sided, 5¼-in. market share with 38%, and Shugart Corp. led in the one-sided, 8-in. market with 63%.

The study, prepared by James N. Porter, includes information on individual revenue

Disk shipments in thousands	1982 Shipments	Forecast			
		1983	1984	1985	1986
8 inch drives					
One side	597.7	329.3	209.9	118.5	61.8
Two sided	1,032.5	1,201.8	1,455.4	1,246.7	1,095.0
8 inch TOTAL	1,630.2	1,531.1	1,665.2	1,459.2	1,156.8
5.25 inch drives					
One side	2,120.1	3,636.2	4,466.7	4,835.2	4,882.6
Two sided	1,477.8	5,992.8	8,583.4	11,486.1	14,695.7
5.25 inch TOTAL	3,597.9	9,629.0	13,050.1	16,495.2	19,418.3
Microfloppy drives					
7.5	292.4	860.0	1,693.0	3,013.1	
TOTAL, ALL DRIVES	5,228.6	11,092.5	15,478.3	19,647.9	23,592.8

Source: Disk/Trend Report

Worldwide Flexible Disk Drive Shipments

and unit shipment projections for flexible disk drives in five separate product groups and provides statistics and analysis on installed drive populations, average OEM selling prices, competitive market shares of manufacturers and a basic review of competing data storage technologies.

The report also contains basic specifications of 285 flexible disk drives and profiles on 57 manufacturers of flexible disk drives worldwide.

The report is priced at \$675 from Disk/Trend, located at 1224 Arbor Court, Mountain View, Calif. 94040.

Xerox Merges Versatec, Office Products Division

LOS ANGELES — Xerox Corp. has announced the consolidation of two corporate organizations into a new division of the company and the appointment of a divisional president, according to Robert Adams, group vice-president and president of Xerox Systems Group.

The new Information Products

Division will combine the resources of Versatec, Inc., a Xerox company in Santa Clara, Calif., and the Xerox Office Products Division in Dallas, where the new division will be located.

Named to head the Information Products Division is Renth Zaphiropoulos, president and co-founder of Versatec Co., who will retain his Versatec responsibilities and assume direction of three business units and staff functions in the former Office Products Division.

The three business units are electronic typing, information processing/personal computing and telecopiers, the company said.

In addition to Versatec's electrostatic printer and plotter line of equipment, the new division's products will include Xerox's Memorywriter typewriters, 860 information processing system, 520-II and 16/8 personal computers and 295, 455, and 495 Telecopier facsimile transmitters.

William C. Jackson Jr., former president of the Office Products Division, will join the Dallas-based Genra Group, which recently acquired Xerox's computer retail stores, as president.

Tandy's Model 2000 Seen Impacting IBM's Plans

By Jeffrey Beeler
CW West Coast Bureau

With the recent announcement of its Model 2000 microcomputer, Tandy Corp. has gained a temporary advantage over IBM in the crowded IBM-compatible personal computer field and will force the industry giant to strengthen its next move in the personal computer arena.

That assessment of the Tandy machine's market impact comes from industry analyst Robert Fertig, president of Greenwich, Conn.-based Enterprise Information Systems, Inc.

In response to Tandy's first IBM-compatible micro, Big Blue

will probably add extra technological muscle to its long-rumored Popcorn Personal Computer, which Fertig envisions as a multiuser workstation incorporating a 32-bit Intel Corp. 8286 microprocessor.

The announcement of Tandy's Model 2000 has, in Fertig's view, also "pulled the rug out from under" Sperry Corp. and "completely neutralized" the latter company's own IBM-compatible micro only days after its formal debut at the Comdex/Fall '83 show [CW, Dec. 5]. The Sperry 16-bit machine incorporates a 7.16MHz Intel 8088-2 and boasts a 50% greater

(Continued on Page 134)

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Local Nets Can't Aid Corporate User

Software Publisher Bemoans Lack of Micro Tools

By Robert Bell

CW West Coast Bureau

SAN DIEGO — The computer industry has created hundreds of thousands of "first-time losers" because of inadequate microcomputer software, an industry expert claimed recently.

Hal Tilbury, president of Bluebird Systems, Inc., a Carlsbad, Calif.-based software publisher, charged that the lack of powerful software means local-area networks are unsuited to the needs of today's corporate user.

"A first-time loser is one who soon discovers that what he bought won't do what he wanted, and disillusionment quickly sets in," Tilbury said here during a work session at the Multi-User Systems and Local Networks Forum, sponsored by Future Computing, Inc.

In large part, it is the computer industry that is to blame, he continued. "We blitz the buyer with Madison Avenue advertising campaigns that make micro-based software sound as if it is just as sophisticated as that found on a mainframe. We sell software designed for personal use to a business without taking the time to determine if it can do a job that it was never really designed to do."

Tilbury said local-area networks are not suited to provide the kind of transaction processing environment required by business data processing users.

What a business needs, he asserted, is the ability to do transaction processing from a centralized common data base, constantly and instantly available to the people in the organization who have a need to know. The user of the system must be allowed to initiate any job from any workstation at any time, and the software available has to be powerful and flexible enough to do the job, he added.

"No wonder the user became a

'first-time loser' is one who soon discovers that what he bought won't do what he wanted, and disillusionment quickly sets in." — Hal Tilbury, president of Bluebird Systems, Inc.

loser. We didn't have the software he needed," Tilbury proclaimed. "The available micro-based software is all oriented to personal computing or support of a single-user work session and just does not match up to the user's needs."

Local-area networks were not designed to accommodate transaction processing, Tilbury said. Rather, they were created out of the desire to al-

low several micros to share expensive disk and printer resources and to communicate with each other. While excellent for individual work session tasks such as word processing, graphics and spreadsheet analysis, local-area networks still do not fit the corporate bill.

Tilbury described local-area networks as too slow and expensive for the business environment. They can-

not efficiently accommodate a common shared data base and cannot really handle true record-locking or file-sharing functions, he complained.

Furthermore, he said, the software used by local networks is Digital Research, Inc. CP/M- or Microsoft, Inc. MS/DOS-based and consequently has been written for a single-user approach.

"Generally speaking, the most successful microcomputer software was written to accomplish a narrowly defined specific purpose. This has not been done with most micro-based operating systems, which have tried to be all things to all people."



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Wang Offers Vision Support

SAN JOSE, Calif. — Wang Laboratories, Inc. has joined a growing list of computer makers offering support for VisiCorp's Vision, the company's integrated operating environment product.

Wang and VisiCorp have inked an agreement giving Wang exclusive marketing rights to Vision applications manager and related Vision software applications for Wang's personal computer. The agreement specifies that Wang will be responsible for the distribution, licensing and promotional activities associated with the marketing of Vision on Wang's micros.

In November, VisiCorp reached a similar agreement with IBM for distribution of Vision on the IBM Personal Computer XT. Other computers that will support Vision include Compaq Computer Corp.'s Plus; Texas Instruments, Inc.'s Professional Computer; Honeywell, Inc.'s 7900 system; and Eagle Computer Corp.'s Spirit and PC Plus.

Electronic Distribution of Business Software

(Continued from Page 129)
could be sent quickly, error-free transmissions cannot be guaranteed.

Piracy is another serious concern of software-publishers who fear losing control when others take responsibility for making copies of their products. They worry that a legitimate copy may be difficult to tell from an illegal one when factory packaging is not part of the sale.

Nevertheless, interest in the concept is building. Eric Bedell, manager of retail marketing for Lotus Development Corp., reported that the subject is "the topic of the month," judging from the number of phone calls he receives each week from market researchers studying electronic distribution. Taylor Coleman, founder

of Softwareland, an Ariz.-based chain of software stores, pointed to similar growing interest.

"I think it has a place down the road, but in the short run it's not viable," Coleman said. "The trend is toward bigger and bigger programs. The successful programs are monstrosities. It won't work until you can speed up the transmission time dramatically."

At 1,200 bit/sec, a 192K-byte program such as the Lotus 1-2-3 would take at least 20 minutes to transmit; at 300 bit/sec, it would take more than an hour and a half. These are minimum elapsed times, however. Many experts say additional time must be allowed to account for errors in transmission.

"There is a question of integrity. Even one bit dropped means that the program won't run" and would need to be sent again, according to Enzo Torresi, co-founder of San Jose, Calif.-based Businessland.

Consequently, an additional "20% to 30% error-correcting factor" is customarily tacked on to the average downloading time, said Dave Wagman, chairman of Softset Computer Products, a physical software distributor which plans to undertake some form of electronic distribution in the future.

Wagman said one of his major concerns is proper documentation. "To send something electronically now, the program must be very small and must require no documentation."

Getting the documentation to the customer will be a problem. You could put it on-line, but then you'd have even bigger programs to transmit," he said.

The significance of personal assistance is a factor many dealers and software "developers" emphasize when discussing the prospects for electronically distributed software.

"It's still important, on the average, that there be a human interaction in the sale of software," Wagman said. He cautioned, though, that this might not always be the case. "If it gets to the point where people don't need point-of-sale, then electronic distribution will displace retail," he said.

Supplemental Channel

Executives at both Softey and PC Telemart claimed that electronic distribution will function as a supplemental channel, handling perhaps 10% of the software distributed.

Most retailers appear unconcerned that downloading services direct to users will take away their businesses. "A significant part of the cost of software is in the form of added value," said Rick Ivatone, president of Incomp Computer Centers, headquartered in Troy, Mich. "And I can speculate from the current state of software that the existing distribution channels will be necessary for a while. I'm very confident that I can continue to add value."

Packaging, too, is an area where electronic distribution is expected to run into some snags. The consumer-oriented marketing lessons they have learned over the last couple of years might not be applicable.

"The big issue is that it's a move toward products becoming intangible," Bedell said. "Packaging and merchandising have become very important as ways for software companies to distinguish themselves."

Beyond marketing considerations, the prospect of unpackaged products also raises many questions about security. An authorized program diskette can look exactly like one that has been illegally copied. "With electronic distribution, the software vendors will lose one important thing that they have today — the fact that every copy looks like it came from the manufacturer," Wagman noted.

Not surprisingly, no major software publishers have yet made a commitment to any type of electronic distribution scheme. Many of them cite the potential for piracy as their chief worry. Others, like Dennis Carelli, director of sales for Software Publishing, voiced concern about maintaining their existing channels. "It will be part of our distribution, but I can't say when," Carelli said. "The lifeblood of our firm is the retail dealer, so we're not going to do anything that takes away from the retailer."

Publishers may be slow to sign up, added Ester Dyson, president of Rosen Research, "because a lot of things have to be worked out. There's no rush, so they're waiting for the other guy to do it first. The idea will catch on, but it will take some time."

Raleigh is an associate editor at Micro Market World, a sister publication of Computerworld.

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Intel Corp. and Immos International, Inc. of Colorado Springs, Colo., have entered into an agreement to develop methods for Chmos dynamic random-access memory (DRAM) products. The two companies intend to work separately on dynamic RAM designs and Chmos technologies, but will keep key specifications consistent.

The University of Michigan's College of Engineering has received a grant of over 200 professional workstations from Apollo Computer, Inc. The workstations will be incorporated into the college's new computer-aided engineering network for engineering students and faculty for instructional and research programs.

Harris Corp. has given a Harris 800 superminicomputer to Clemson (S.C.) University. The gift will be used for research programs by faculty and students in the electrical and computer engineering department.

Wang Laboratories, Inc. and Visi-corp have signed an agreement giving Wang exclusive marketing rights to the Vision application manager and related Vision software applications for the Wang Professional Computer. Under terms of the agreement, Wang will be responsible for the physical distribution, licensing and promotional activities associated

with the marketing of the software.

Automatic Data Processing, Inc.'s ADP Autonet and Digital Communications Associates, Inc. (DCA)

have announced a joint development project that enables both DCA communications products and Digital Equipment Corp.'s Unibus-compatible devices, including the PDP-11

and VAX-11 series computers, to link directly with the ADP Autonet public data network without the need for protocol conversion.

(Continued on Page 137)

Tandy Seen One Up on IBM, for Now

(Continued from Page 129)

execution speed than its IBM counterpart, the company said.

The new Tandy micro, announced only three days later, is built around an 8MHz Intel 8186 and reportedly offers twice the clock speed of the industry giant's micros. A reportedly superior microprocessor and doubled clock speed enables the Model 2000 to operate from 2.5 to four times faster than IBM's XT, according to Tandy executive vice-president Ron Stegall.

But if the Tandy machine constitutes something of a coup from a purely technological perspective, Fertig claimed that from a marketing standpoint the company's announcement may have been ill conceived.

"Tandy shot itself in the foot by introducing the 2000 at Comdex," Fertig said. "The company's sales force was caught off guard by the announcement and hadn't been trained to demonstrate or sell the product."

Fertig also faulted Tandy for neglecting to provide users of its existing systems with a clearly delineated migration path to the Model 2000. Because of its ability to run the same

software as the IBM Personal Computer, the firm's latest offering lacks compatibility with its older sister systems, which support Tandy's own proprietary operating system.

The Model 2000 thus marks a sharp departure from its developer's traditional product direction and will "make the company's [existing] users wonder whether they're going to be left out in the cold," he said.

The abrupt change in product course will also create additional uncertainties among the firm's users about what systems moves their supplier is likely to make in the future, he added.

Fertig further criticized Tandy for reportedly failing to accompany its Model 2000 announcement with price cuts for the company's existing systems, thus creating a "lopsided" pricing structure that works to the old products' disadvantage. "Why would anyone want to buy one of Tandy's existing [personal computers] now that the 2000 has arrived on the scene?" he asked.

Taken together, Fertig concluded, the mistakes in Tandy's latest microcomputer introduction make the

firm's entry into the world of IBM compatibility look "haphazard" and create the impression that the vendor acted "without considering all the possible ramifications."

Tandy's Stegall rejected Fertig's claim that Tandy failed to prepare adequately its sales force for the Model 2000's announcement. "Every one of our 6,500 sales people received four hours of training on the machine" prior to its debut, he said.

Steggall also minimized the significance of the 2000's incompatibility with its sister systems and defended his firm as having compiled an impressive track record for "sharp" retail pricing. "The lack of compatibility with our other systems isn't really all that important because the Model 2000 was never intended as a replacement for any of our existing products," he said.

In any event, Stegall added, Tandy's history of supporting its customers with distinct migration paths has been "outstanding."

In general, he characterized the company's recent Model 2000 announcement as well planned and executed.

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PARADISE

Supershorts

(Continued from Page 134)

Chrysler Corp. and **Control Data Corp.** have signed a memorandum of intent to develop jointly a new generation of computer-aided design (CAD) software. The companies said the cooperative venture will significantly advance state-of-the-art software technology in mechanical CAD engineering and analysis. Chrysler plans to use the jointly developed software in its vehicle design

and development programs. CDC will market the CAD programs through its computer products and services organizations.

A corporate grant of \$417,955 from **Digital Equipment Corp.** has allowed Boston's **Wentworth Institute of Technology** to acquire DEC's VAX-11/780, 12 SLI-11 and 30 VT180 computers.

Datapoint Corp. has announced plans to participate in the Boston Computer and Communications Center, **Boscom**. The Datapoint Learning Center will feature the company's office-oriented products operating in a Tandem Computers, Inc. ARC local-area network environment and will emphasize a hands-on approach.

The American Electronics

Association (AEA) has announced a 17% increase in new members in 1983. A total of 2,350 electronics and information technology companies are participating in the organization, according to the AEA year-end report. The number of AEA associates — financial, professional and business organizations that maintain close relationships on a continuing basis — increased

from 397 in 1982 to 473 in 1983.

Joseph J. Kroger, president, **Computer Systems Operations** at **Sperry Corp.**, has announced a consolidation of the office information systems and the communications terminals operations. The combined organization will be headed by **Stuart J. Miller**, vice-president, office information systems.

Nickels & Dimes

Compaq Computer Corp. has begun an initial over-the-counter offering of six million shares of common stock. The offering price per share was \$11.

\$\$\$

Analog Devices, Inc. has reported a 23% increase in sales and an 8% increase in net income for the fiscal year ended Oct. 29, 1983. Sales reached \$214 million, and net income was \$18.4 million.

\$\$\$

Wyle Laboratories has reported sales for the quarter ended Oct. 31 of \$79.2 million, up 53% over the same period last year. Net income was \$2.5 million, or 33 cents per share, compared to a net loss of \$1.5 million last year.

\$\$\$

Televideo Systems, Inc. has reported sales of \$168.7 million and net income of \$22.4 million for the fiscal year ended Oct. 31, increases of 71% and 76%, respectively.

\$\$\$

Western Digital Corp. has completed a public offering of 2.8 million common shares. Proceeds totaled \$24.4 million, of which \$17.5 million will be used to repurchase 2.2 million shares of the company's stock presently held by First Interstate Bank of California. Remaining proceeds will be used to reduce short-term debt.

\$\$\$

AM International, Inc. has reported a \$7.1 million increase in net income on a 4.4% increase in revenues for the first quarter of fiscal 1984, ended Oct. 29. Net income was \$2.5 million, or 24 cents per share, compared with a net loss of \$4.6 million, or 45 cents per share, for the first quarter of 1983.

\$\$\$

Cambex Corp. has reported a loss of \$1.9 million, or \$1.09 per share, for the fiscal year ended Aug. 31, compared with income of \$76,000, or 4 cents per share, for fiscal 1982.

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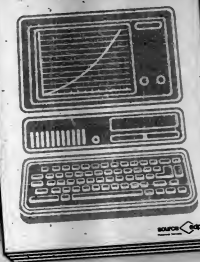
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These positions require a BS or MS in geophysics or physics with strong skills in software development, or a BS or MS degree in computer science or math with strong skills in seismic software development.

Geophysical Data Base Analyst

Requires expertise in using structured analysis and design techniques to analyze, design, specify and test geophysical data base management systems for use with state of the art seismic interpretation systems:

BS or MS degree in computer science, math or related field is required. Minimum 3 years' training and experience in the analysis, design, specification and testing of software systems under a structured environment is required.

Individuals should have above average skills in interpersonal relations, written and oral communications. Project management skills are desirable.

All positions require familiarity with FORTRAN 77. Experience with DEC (VAX-11/750 & VAX-11/780) and CRAY IS-X-MP systems is desirable. DEC assembler, DEC systems internal, data base management systems, graphics software and hardware experience is preferred.

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Individual will assist in planning and performing the administrative and technical activities involved in hardware and software installation and operation of all Project Athena computers. Develop and implement procedures and establish control. Communicate with users and interface with hardware/software vendors. Assume system and user the backup and recovery. Qualifications include: experience with UNIX operating system, supervision of computer systems operations and maintenance, and logistics support in academic environment. Excellent interpersonal and communication skills required.

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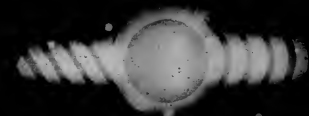
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COMPUTERWORLD

15 pointed questions to ask MSA or any software supplier

These questions will help you when you sit down with individual software companies.

They're tough questions. Relevant ones. And any supplier who is worth his salt should be able to answer them without backpedaling.

Ask MSA

We'll answer all these questions to your satisfaction—plus any others you may have.

In fact, we're probably the best equipped to answer them. Because MSA is *its* software company. We offer the most complete line of totally integrated systems in the software industry, including financial, human resource and manufacturing.

So you avoid the headache of trying to tie together individual systems. (And the even bigger headache of adding to them.)

With MSA's integrated systems, there's no unnecessary duplication of data or effort. Reporting is faster. All your company's information is more timely and accurate—and in the right form.

Our technical edge comes from experience

Saying ahead is easier for a company that's steeped in software technology. MSA has spent years developing, refining, testing and enhancing our systems.

This year alone, we'll invest \$25 million to make sure all our systems are technologically razor sharp. That gives us a decided advantage over flash-in-the-pan technology that may not have the bug-free logic of a more experienced system.

It also gives you a decided advantage over "custom" systems you have to update yourself.

MSA relieves you of that time-consuming burden. We update and enhance your software for a full year. Then we continue this service for a surprisingly low annual fee.

Maintenance includes keeping your system up-to-date technologically. Enhancing it with new features that make it work even harder for you.

And making sure it reflects changes in accounting procedures and government regulations, including 401(k), TEFRA, and FAS52. (That eliminates a lot of tedious work you normally have to do.)

Save this box. It can help you make an intelligent software decision.

1. Can you offer us a complete range of software systems designed to work together?
Or will we have to piece together a patch-work of systems?
2. Are your systems truly record-keepers, or can they really help us make decisions?
Can we pull together information from any of our integrated systems? In exactly the form we want it?
3. Can you provide business software for both mainframe and microcomputers?
Do you develop this software yourself or do you simply market it for another company?
4. Are your systems truly online is current?
How many of your systems are online? How secure are they?
5. Will any company have to be the one that discovers the bugs in your brand new systems?
Just how long have your systems actually been used, and how have they been tested?
(Management Science America, 3445 Peachtree Road, N.E., Atlanta, Georgia 30326)
6. Will you update your systems as technology advances and regulations change?
What are some of your most recent updates? Will you keep us current on regulatory changes?
7. Do your systems really do everything you say they will?
Or will we have to change them or add to them to get the features we want?
8. How long have you been in business?
What are your revenues? What is your growth record? Where will your company be five years from now?
9. How many systems has your company installed?
How many of these were installed in the past six months? How many of your earlier customers are still using—and liking—your systems?
10. Do your financial systems handle unlimited foreign currencies?
Do your financial systems use a common set of currency exchange rates?
11. Can you link our executive computers directly to the mainframe—so they can get their own information?
Is that software available right now?
12. How will you make sure our own people thoroughly understand your system?
Do you have educational centers near us, or will we have to travel all the way across the country to find one? Will you be there to help during installation and after?
13. How many of your people specialize in software for our industry?
How many accountants work for you? Human resource specialists? Manufacturing experts?
14. Are built-in features that make them easier to use?
What happens if someone needs help figuring out a feature? Do you have online documentation that's easy to understand?
15. As my business changes, will your system be flexible enough to change with it?
Or will we have to pay a lot to rework it? Or even regenerate it?

35,000 days of training

At MSA, we make sure your people have a firm grasp of our systems. Last year alone, we conducted more than 35,000 student days of customer training for over 1,800 companies. At education centers all over the world, as well as at our headquarters.

From training sessions to cassette tapes to complete, easy-to-understand documentation, MSA provides the most extensive Customer Education Programs in the industry.

And MSA systems are just as friendly as our people. Our online HELP feature actually guides users through our systems, and EASYSCREEN™ lets them design their own screens without creating data processing nightmares.

If there's ever a question or problem with our systems, MSA customers are always close to service.

Our Account Managers are knowledgeable, responsive, and backed by a complete team of industry specialists.

The heart of our integrated systems

It's MSA's General Ledger System. Combined with Accounts Payable/Purchase Order Control and our other systems, it gives your company complete control over your financial information.

Over 800 data processes

ing specialists, accountants and financial experts work together to make MSA's financial systems the most advanced and most highly integrated in the industry.

MSA has the answers

Whatever your size—whatever your business—MSA has a total software solution.

We'll provide the highest quality integrated online software.

We'll tie your business and manufacturing software systems together, using our exclusive Extended Closed Loop manufacturing system.

We'll provide business software for your microcomputers, through our Peachtree Software Company.

We'll even link your microcomputers to your company's mainframe—with

MSA Executive Peachpak™ application software. A revolutionary concept that lets executives get the mainframe information they need through their personal computers.

Talk to us

If we've whetted your appetite with our 15 questions, clip the coupon below.

We'll send you a concise booklet that will help you even more in your deliberations. We'd also like to send you more information on how MSA can help you plan for software. And on individual systems.

Just fill in the information below, or contact Robert Carpenter at (404) 239-2000.

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8. Order Processing
9. Foreign Exchange
10. Inventory & Purchasing
11. Payroll
12. Personnel Management & Reporting
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15. Peachtree Software™ business systems for microcomputers
16. Peachtree Software™ office productivity systems for microcomputers

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☐ Please send more information on the following systems. (Write numbers from 1 to 16 in the box.)

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